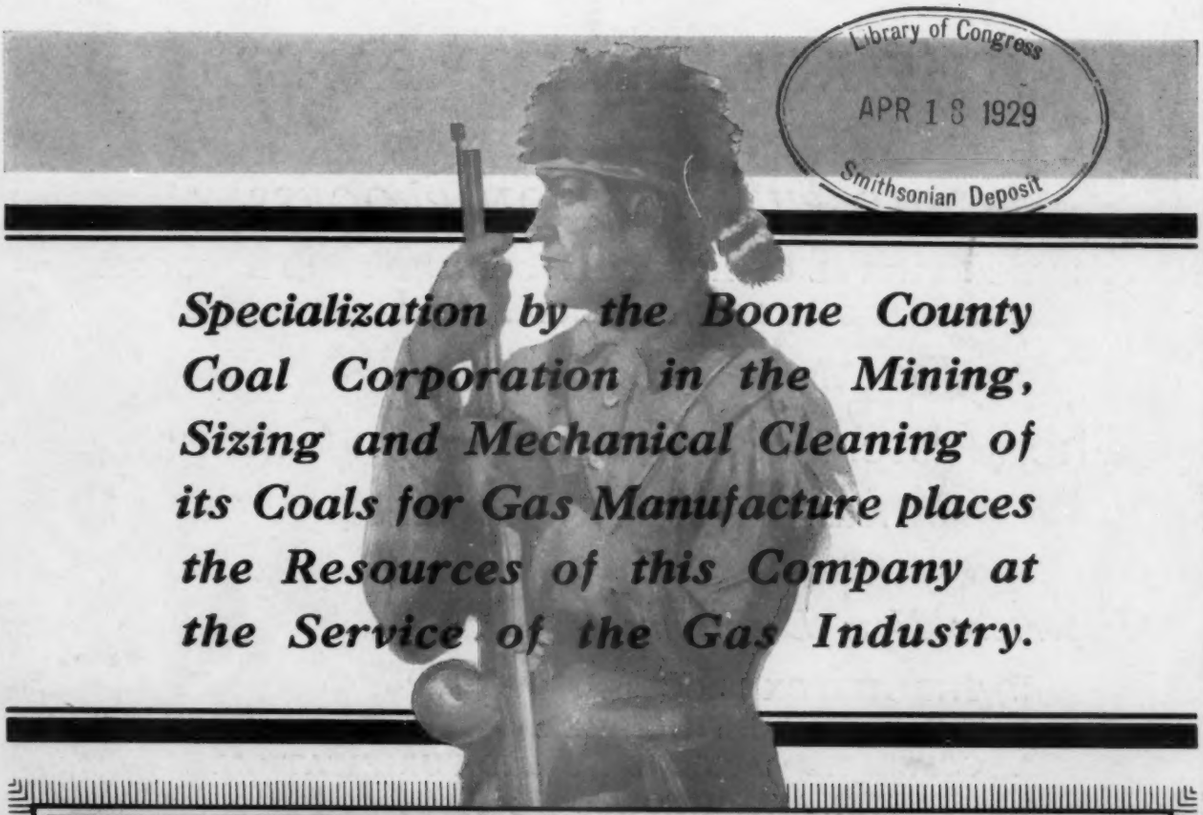
Vol. 130, Number 4 APRIL, 1929 Price 25 Cents

AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including GAS INDUSTRY Est. 1900

Library of Congress
APR 18 1929
Smithsonian Deposit



Specialization by the Boone County Coal Corporation in the Mining, Sizing and Mechanical Cleaning of its Coals for Gas Manufacture places the Resources of this Company at the Service of the Gas Industry.

BOONE-CHILTON
GAS COALS
WATER GAS - COAL GAS
BY-PRODUCT
BOONE COUNTY COAL CORP - PHILADELPHIA - CHICAGO

Announcement

ARRANGEMENTS HAVE BEEN COMPLETED, WHEREBY

THE KOPPERS COMPANY'S

LIQUID PURIFICATION PROCESSES

FOR THE REMOVAL OF HYDROGEN SULPHIDE AND HYDROGEN CYANIDE FROM GAS WILL HEREAFTER BE OFFERED BY

The Western Gas Construction Company

A subsidiary of The Koppers Company

Important New Developments

1. THE THYLOX PROCESS.
2. THE PRESSURE THIONIZER.
3. COMBINED GAS COOLING AND PURIFICATION.
4. ACTIFIER AIR DISPOSAL.

The Western Gas Construction Company

Subsidiary of The Koppers Company

FORT WAYNE, INDIANA.

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

Executive and Editorial Offices, 53 Park Place, New York City

S. G. KRAKE, *President and Treasurer* A. M. GLEASON, *Secretary*

H. M. RILEY, *Editor*

R. S. MCBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 130, No. 4 April, 1929 Whole Number 3664

TABLE OF CONTENTS

A Fitting Recognition 23
Open Season for Hawking 24
Is This The Answer? 24
Low-Temperature Coking on a Commercial Scale 25
Interpreting the Company to Stock Holder and Employee 25
Solving the Problem of "Standardized" Standards 25
World's Largest Low Temperature Carbonization Plant 26
Service Connections for Gas Mains 28
The Gasification of Coal in the Generator —By Fritz Morawski 30
Gas. vs. Electricity for Compressor Operation 34
Relation of Barometric Conditions to the Density of Natural Gas—By R. H. Locke 37
Selling the Industrial Gas Prospect—By Ralph L. Manier 39
Gas Is a Great Help to the Varnish Maker 41
Making Glass Container Caps with the Aid of Gas 41
"Every Employee A Salesman"—By H. E. Cox 43
Technical and General Miscellany 46
Book Review 48
What About This New Competition?—By William H. Matlack 49
Saleshots 50
Domestic Survey Results in Portland, Oregon—By O. B. Server 54
Sell Them the Latest—By Ray Martin.. 54
Increasing the Domestic Load in the Face of Competition 59
Suggestions for Increasing the Cooking Load—By J. F. Dunn 60
Equipment News 61
Important Higher Court Decisions Involving Gas—By Leo. T. Parker 63
News of the Gas Industry 65
Personals 72
Trade News and Construction 76
Cope Tackles Increased Gas Consumption Problem of Illinois Gas Association Convention 82
Oklahoma Utilities Association Hold Successful Convention 84

INDEX TO ADVERTISERS, PAGE 117

AMERICAN GAS JOURNAL, April 1929, Vol. 130, No. 4. Published monthly by American Gas Journal, Inc., at 34 N. Crystal St., East Stroudsburg, Pa. Executive, Editorial, and Business offices at 53 Park Place, New York, N. Y. Application made for entry as second-class matter, October 6, 1928, at the postoffice of East Stroudsburg, Pa., under the Act of March 3, 1879.

Subscriptions $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

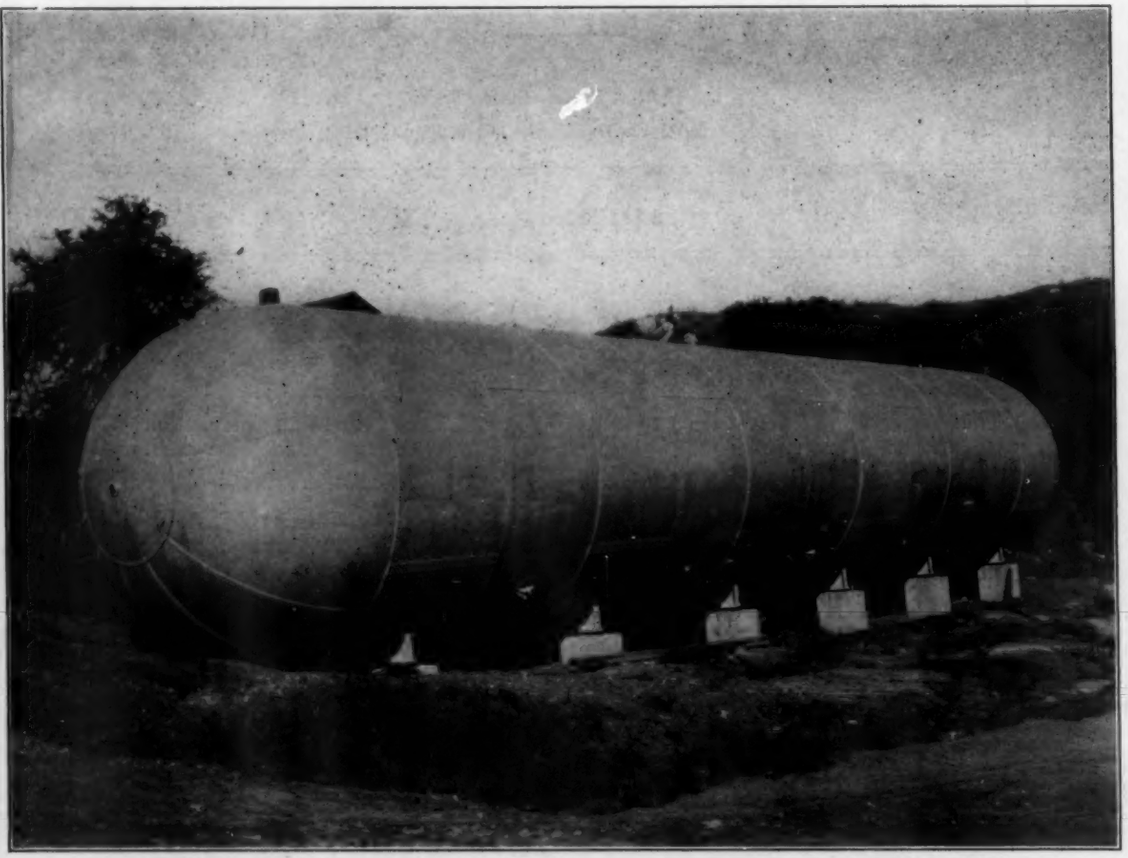
Subscription $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

JAMES T. HEED, *Advertising Rep.*
53 W. Jackson Blvd., Chicago, Ill.

F. P. CURLEY, *Service Department,*
53 Park Place, New York.

NORMAN C. NOURSE, *Advertising Rep.*
681 Market St., San Francisco, Cal.

HIGH-PRESSURE HOLDERS
OF QUALITY



High Pressure Gas Holder 20' 0" diameter by 111' 0" long with hemispherical ends, having a storage capacity of 100,000 cubic feet between 5 lb. and 50 lb. pressure. Constructed at Easton, Pa., for the Easton Gas Works.

WRITE US FOR INFORMATION AND QUOTATIONS ON STORAGE OF THIS TYPE.

THE STACEY MANUFACTURING CO.

ENGINEERS AND BUILDERS

J. FRANK STACEY, *President and General Mgr.*
GEO. H. CRESSLER, *General Sales Mgr.*
T. C. RANSHAW, *Vice-President.*
W. D. BIRBECK, *Sales Engineer.*
A. E. HARVEY, *Sales Engineer.*
EDW. J. BAECHLE, *Secretary and Treasurer.*
FRANK O. PANDORF, *Chief Engineer.*

THE BUILDERS OF STACEY GAS HOLDERS FOR SEVENTY-EIGHT YEARS

CINCINNATI - - OHIO

NEW YORK OFFICE: 52 VANDERBILT AVENUE

There Is No Such Thing as a Special Fitting

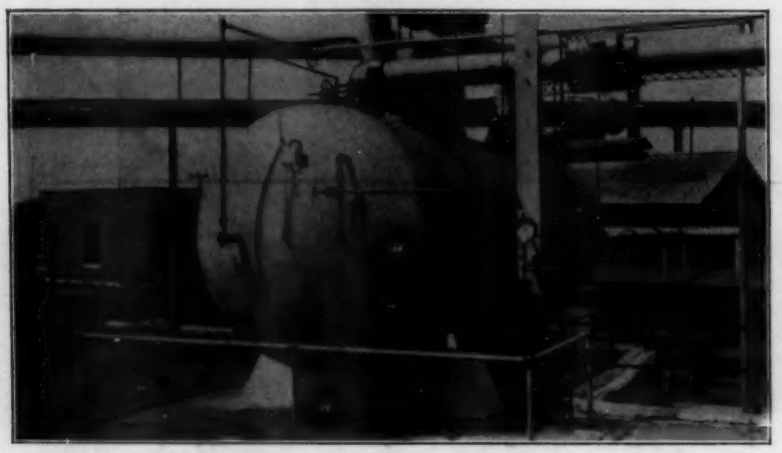
"When making a pipe layout, eliminate flanges wherever possible by combining pipe and fittings. Almost any shape or special fitting can be made from steel at a cost no greater than the patterns for cast iron fabrication."—*Excerpt from our code of standards for fabricating pipe and fittings.*

There is no pipe layout so complicated that it cannot be built under our standard shop practice.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

SMOOT STEAM ACCUMULATOR

Smoot Steam Accumulator at the Georgia Power Company, Atlanta, Georgia. The United Engineers and Constructors, Inc., Engineers.



Smoot Steam Accumulator at Georgia Power Company, Atlanta, Georgia, showing Smoot control regulating steam pressure from accumulator to water gas machines.

Recent Installations of SMOOT STEAM ACCUMULATORS and CONTROL SYSTEM

Portsmouth Gas Company
Portsmouth, Virginia

Detroit City Gas Company
Station J, Detroit, Michigan

Philadelphia Suburban Counties Gas & Electric Company
Chester, Pa.
United Engineers & Constructors, Inc., Engineers

Public Service Company of Northern Illinois
Station 28,
Niles Center, Illinois

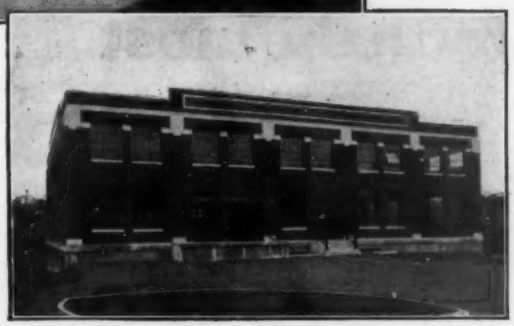
Kokomo Gas & Fuel Company
Kokomo, Indiana
United Engineers & Constructors, Inc., Engineers

Luzerne County Gas & Electric Co.
Nanticoke, Pa.
United Engineers and Constructors, Inc., Engineers

SMOOT ENGINEERING CORPORATION
136 Liberty Street **New York**

SMOOT CONTROL

For the CONSTRUCTION *of* SERVICE BUILDINGS . . .



WE are now completing the eighth service building which we have designed and constructed for prominent utilities companies within the last few years. These buildings house meter inspection and repair shops, storerooms for gas appliances, gas service supplies and meters, storage and repair shops for automotive equipment, etc.

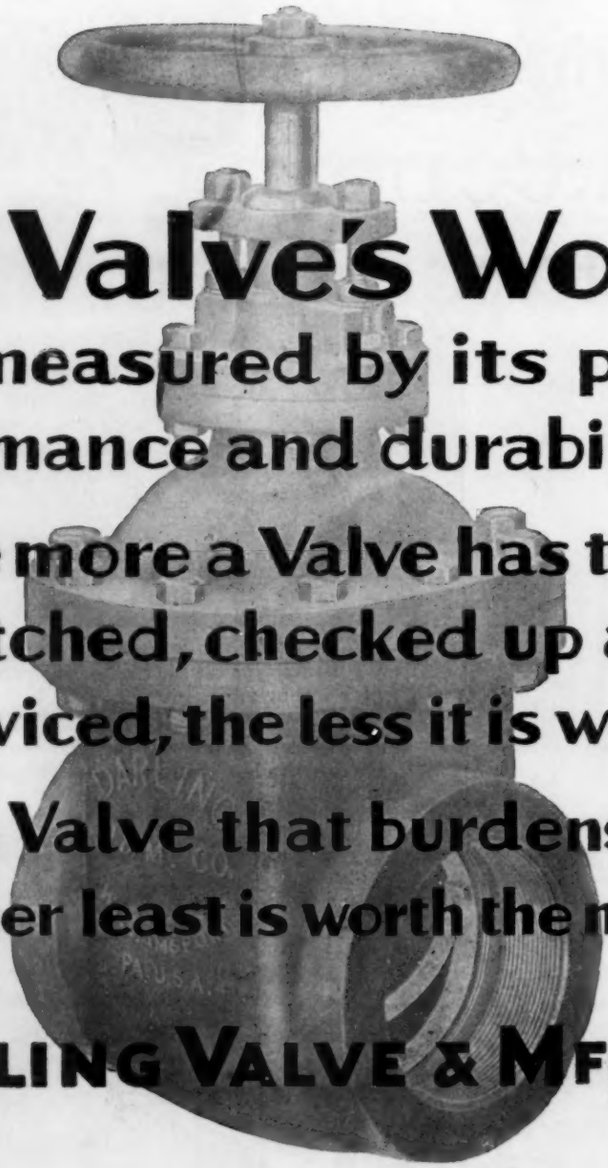
Important savings in money and time can be effected in the handling of materials by the proper arrangement of service departments with respect both to each other and to shipping facilities.

The rapid growth of gas companies in recent years frequently makes the servicing problem one of considerable importance.

If you have service buildings of any character under consideration, let us give you the benefit of our experience—which embraces companies serving from 15,000 to 400,000 meters.

THE U. G. I. CONTRACTING COMPANY
DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS
INCORPORATED
DWIGHT P. ROBINSON, PRESIDENT
Broad and Arch Streets, Philadelphia

Chicago Atlanta



A Valve's Worth

is measured by its performance and durability

The more a Valve has to be watched, checked up and serviced, the less it is worth

The Valve that burdens its owner least is worth the most

DARLING VALVE & MFG. CO.

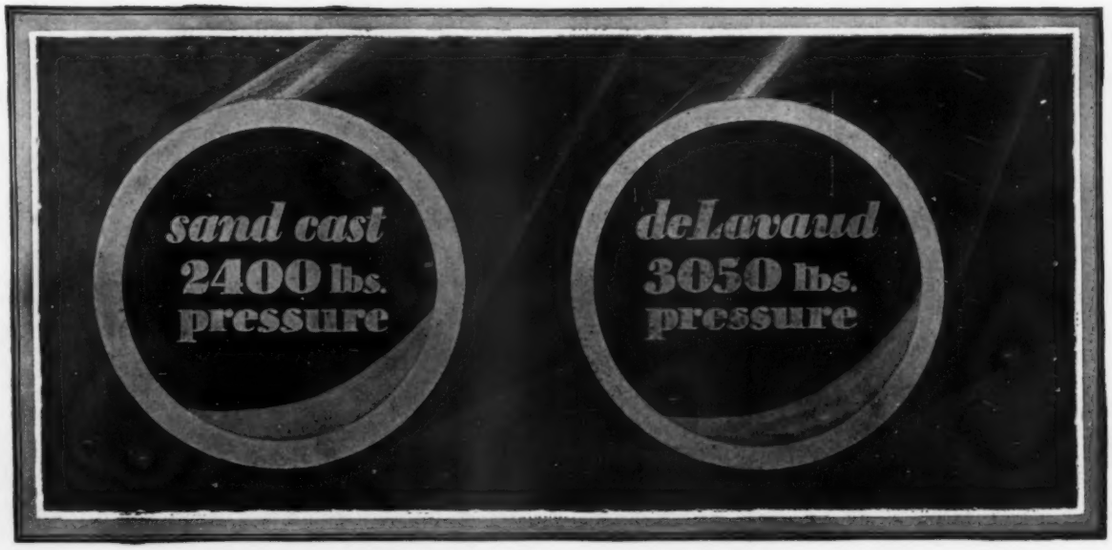
Williamsport, Pa.

New York Chicago Oklahoma City Houston

DARLING

GATE VALVES

It *takes* 25% greater pressure to burst deLavaud pipe



THE above illustration shows the relative thickness of deLavaud and sand cast pipe. Both have the same outside diameter but deLavaud has the larger inside diameter and therefore, increased carrying capacity. ***Yet this thinner deLavaud pipe is at least 25% stronger than any other cast iron pipe.***

In hydraulic bursting tests, deLavaud withstands more than 3000 pounds pressure per square inch—over 25% higher reading on the gauge than "sand cast" pipe attains. This remarkable ability of deLavaud pipe to withstand internal pressure results from the dense, close-grained structure of the metal itself, and freedom from slag and gas bubbles.

deLavaud pipe is made by pouring the molten iron into a rapidly revolving cylindrical mould. Centrifugal force holds the molten metal against the sides of the mould, and drives impurities out of the metal *with a pressure 40 times greater than gravity.*

In addition to its greater strength and uniformity, deLavaud offers greater carrying capacity than other pipe, size for size.

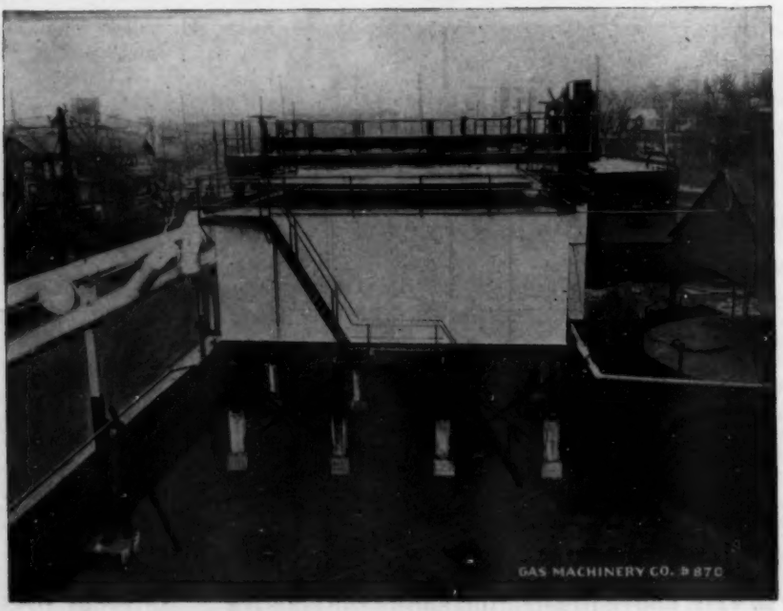
Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

United States Cast Iron Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: Chicago, Philadelphia, Buffalo, Cleveland, New York, San Francisco, Los Angeles, Seattle, Birmingham, Dallas, Kansas City, Pittsburgh, Minneapolis

Efficient Purifiers

—We have built them for others
—We can build them for you



These steel purifying boxes were recently completed for one of the large eastern gas companies.

They are completely fabricated and ARC welded in the field. This structure is 64 ft. long, 32 ft. wide and 12 ft deep, divided by a partition into two equal sections.

Oxide for filling is handled into the boxes by a bucket elevator conveyor, mounted on the Gantry crane used for lifting and transporting of the covers.

The bucket elevator discharges into a screw type conveyor also carried on the Gantry crane, running in a trough provided with discharge gates, and by means of this combination the oxide may be discharged into practically any part of the box.

The spent oxide is discharged thru self-sealing doors in the bottom of the boxes.

In designing the purifiers, provision was made for adding additional compartments as required. The gas manifold has branches for connecting to the future extension.

We also build coal gas, water gas and oil gas plants, as well as their constitutent parts.

Our chief aim is to provide you with equipment most adaptable to your requirements. Our Engineers are available to help you with your problems.

The Gas Machinery Company

Cleveland **Ohio**

New York Office 812 Graybar Building

E. E. Witherby, Eastern Representative

Connersville High Pressure Meters at Hudson Valley Coke & Products Corporation, Troy, New York

Dependable Measurement at the Source in High Pressure Gas Distribution Systems

The linking together of our cities by gas mains and the construction of larger gas manufacturing plants is one of the progressive movements of the gas industry toward more dependable and economic operation. This long distance transmission of gas, of course calls for metering equipment of a reliable type, both at the manufacturing plant or coke oven, and at governor stations.

At Troy, New York, the Hudson Valley Coke and Products Corporation uses the 18 x 27, 16 x 32 and 12 x 24 Connersville High Pressure Meters to record the gas delivered into the lines leading to Albany, Schenectady and to the city of Troy. Duplicate meters are used also by the local distributing organizations.

The users of these meters place confidence in the records because they know that the operating principle and the sturdiness and accuracy of construction of Connersville Meters assure reliability of meter service.

Submit your metering problem to the engineer at the nearest Connersville Office.

The Connersville Blower Company

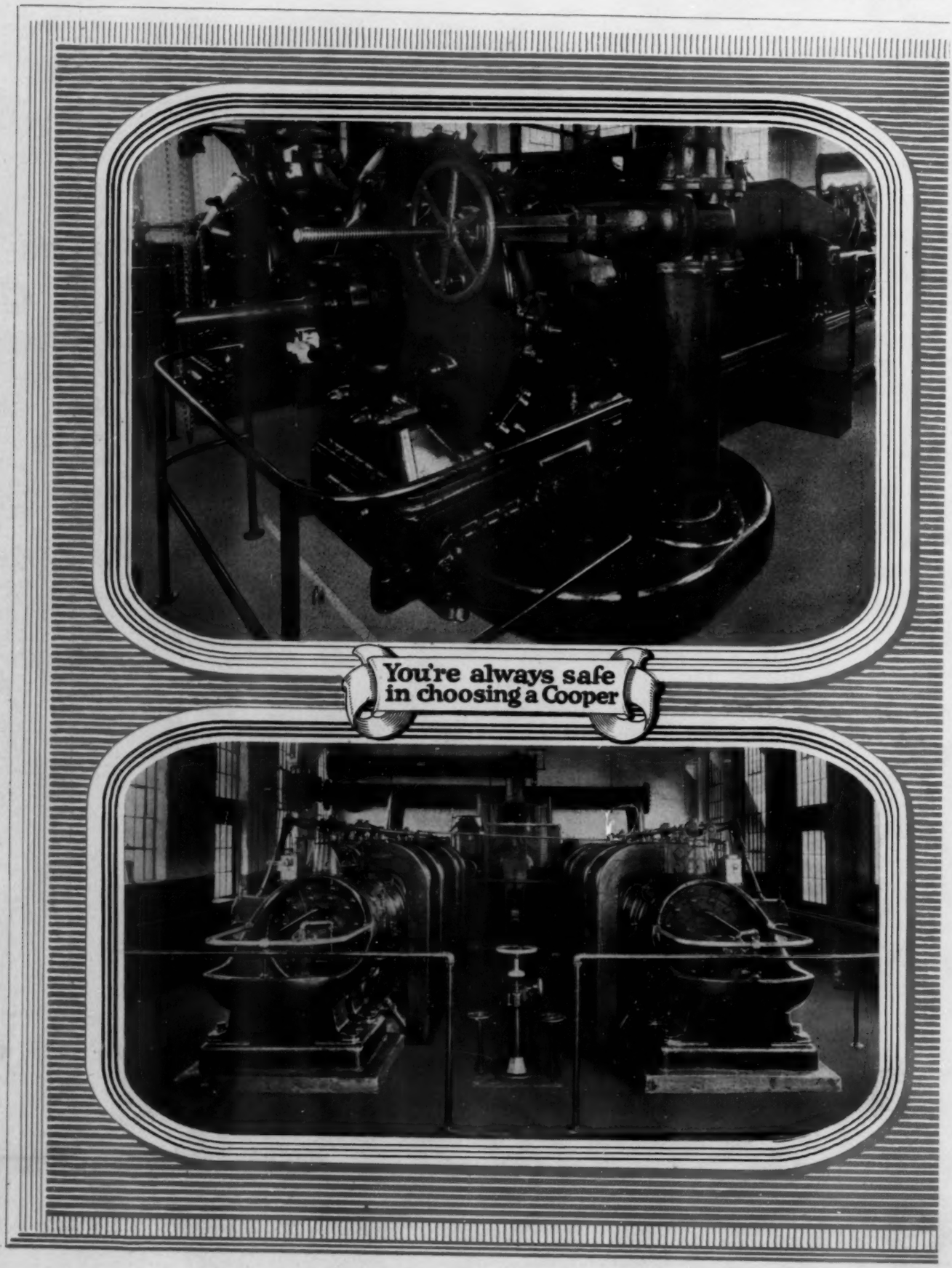
12th Street and Columbia Avenue
Connersville, Indiana

SALES OFFICES

114 Liberty St.	**Chamber of Commerce Bldg.**	**53 W. Jackson Blvd.**	**250 Stuart St.**
New York City	**Pittsburgh, Pa.**	**Chicago, Ill.**	**Boston, Mass.**

CONNERSVILLE

Blowers • Gas Pumps • Meters • Cycloidal Pumps


You're always safe
in choosing a Cooper

What Do You Mean by—

"the tendency is toward gas engine compressors?"

Here's what an authority wrote the other day in answer to that question:

"UP until a few years ago the gas engine driven compressor was very seldom used in this field due to the cost of manufactured gas as compared with natural gas.

NOW with the increasing trend toward high pressure transmission, the gas engine is being given increased consideration particularly for those situations where the compressors are not located at the main plant and where the load factor is low — and this applies to a great many situations.

WHEN compressors operate only a few hours per day, steam is very expensive due to the need of steam plant investment and maintenance for a maximum capacity which is used only a few hours per day. The electric drive is also expensive under the same working condition, as electricity is sold under both commodity and demand rate and the demand rate is prohibitive when the load factor is low.

IT is for these reasons that the use of gas is increasing; for although the price of gas itself is high, the overall cost of its use is less than either steam or electricity where the load factor is low."

We would like to hear from any reader who can better describe the present power situation which the manufactured gas industry is facing than this authority has done. We also would like to hear from any reader who is debating the power question in connection with distribution extensions or improvements. The facts and figures we have will be quite helpful.

Cooper gas engines are built in standard sizes from 50 to 1500 B. H. P.

THE C. & G. COOPER COMPANY

MT. VERNON, OHIO

615 Kennedy Building, Tulsa *1116 Magnolia Building, Dallas*
630 E. 61st Street, Los Angeles

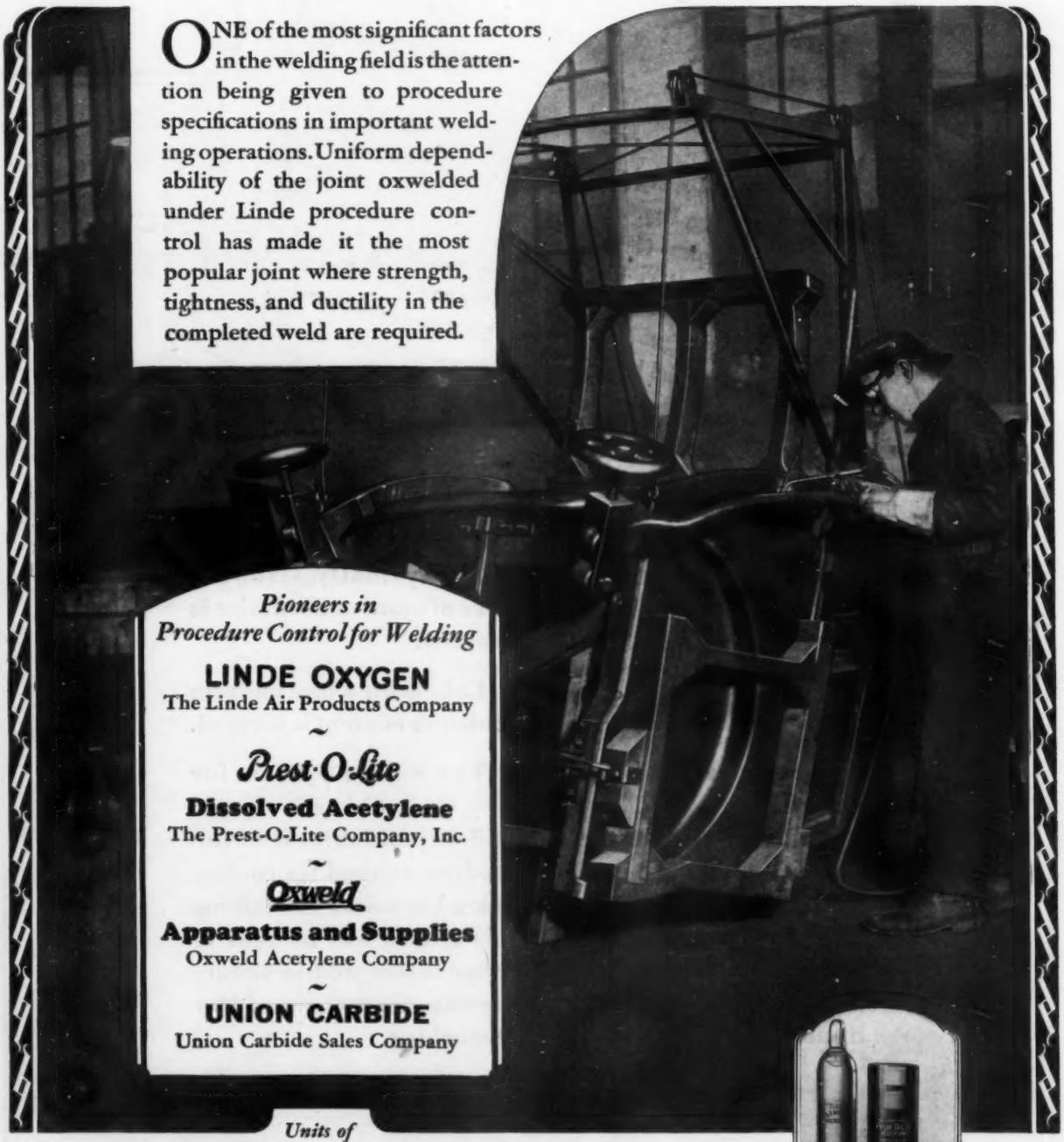
Gasholders
Condensers
Purifiers
Scrubbers
Tanks
Pipes
Stacks—Flues
Steel Plate Construction

CRUSE-KEMPER COMPANY
AMBLER, PENNA.

Western Union Code, Cable Address: Cruskemper, Ambler

Specify
"Oxwelding under Procedure Control"

ONE of the most significant factors in the welding field is the attention being given to procedure specifications in important welding operations. Uniform dependability of the joint oxwelded under Linde procedure control has made it the most popular joint where strength, tightness, and ductility in the completed weld are required.



Pioneers in Procedure Control for Welding

LINDE OXYGEN
The Linde Air Products Company

~

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Company, Inc.

~

Oxweld
Apparatus and Supplies
Oxweld Acetylene Company

~

UNION CARBIDE
Union Carbide Sales Company

Units of

UNION CARBIDE AND CARBON CORPORATION

General Offices UCC *Sales Offices*

30 East 42nd Street, New York, N.Y. In principal cities of the country

55 Oxygen Plants–38 Acetylene Plants–99 Oxygen Warehouses–100 Acetylene Warehouses–38 Apparatus Warehouses–235 Carbide Warehouses

First Dry Quenching Installation in Michigan is included in 1929 Consumers Power Budget

Work will soon begin on the erection of a Dry Quenching Equipment plant at the Court Street Plant of the Consumers Power Company, Flint, Michigan.

The initial installation at Flint will provide for dry quenching approximately 280 tons of coke per day and provision is made so that this dry quenching installation may be extended to care for 500 tons of coke per day.

DRY QUENCHING is a step toward increased efficiency in coke production – for instance:

One thousand pounds of high pressure steam is secured per ton of coke cooled.

Reduced maintenance results on hot coke car and plant steelwork through absence of corrosive vapors from quenching water – no cold weather freezing troubles.

A physically stronger coke of more uniform size is secured.

Coke with a low uniform moisture content is assured.

The Sulzer System for Dry Quenching is simple and dependable. It is the modern method for cooling coke. Literature describing this system will be sent to those interested in securing the advantages of Dry Quenching.

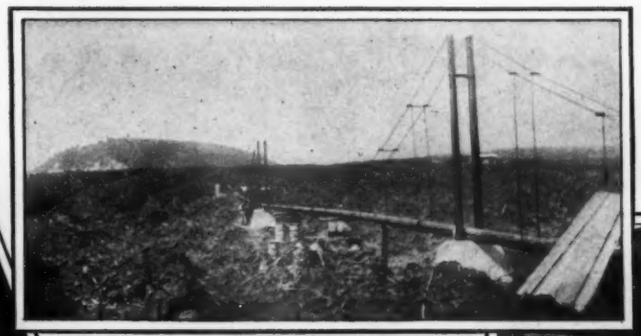
Dry Quenching Equipment Corporation

INTERNATIONAL COMBUSTION BUILDING

200 MADISON AVE. NEW YORK ~ N.Y.

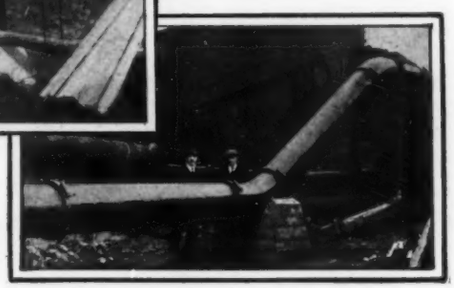
A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

"FOR EVERY JOINT ON THE LINE"



10 inch oil line in Trinidad fitted with Victaulic Couplings

24 inch cast iron sewage main



20 inch circulating line for condenser

VICTAULIC COUPLINGS

The same reasons led to the selection of Victaulic Couplings for these lines—speed, ease and economy in installation, permanent leak-tightness and freedom from line distortion.

Victaulic Couplings can be installed by unskilled labor. They can be fitted in place faster than any other coupling—in a fraction of the time needed for screwed, flanged or caulked joints. They are not affected by line sag or vibration. Every Victaulic Coupling is a flexible joint which takes care of contraction and expansion in the pipe lengths it connects.

Victaulic Couplings are supplied for all sizes of steel, wrought iron and cast iron pipes from ¾ inch up—for all pressures from vacuum to ten tons pressure per square inch. Victaulic Fittings make it easy to connect the line with any existing lines. Mail the coupon for Victaulic Bulletin.

VICTAULIC COMPANY OF AMERICA
26 Broadway, New York

VICTAULIC DISTRIBUTORS:

Western
SMITH SEPARATOR COMPANY
Tulsa, Oklahoma

Pa., Md. and W. Va.
JOINER IRON WORKS
Clarksburg, W. Va.

Canadian
D. B. McWILLIAMS
Toronto, Canada

New England
EASTERN SERVICE COMPANY
Boston, Mass.

Illinois, Indiana
BELL & GOSSET
Chicago, Ill.

Minnesota, Wisconsin
F. S. VAN BERGEN
Minneapolis, Minn.

Ohio
CASE HARDENING SERVICE COMPANY
Cleveland, Ohio

The all-purpose coupling

"For every joint on the line"

FLEXIBLE LEAK-PROOF
VICTAULIC
REG. U.S. PAT. OFF.
PIPE COUPLINGS

For list of uses and users and detailed information on Victaulic Couplings, fill in and mail this coupon.

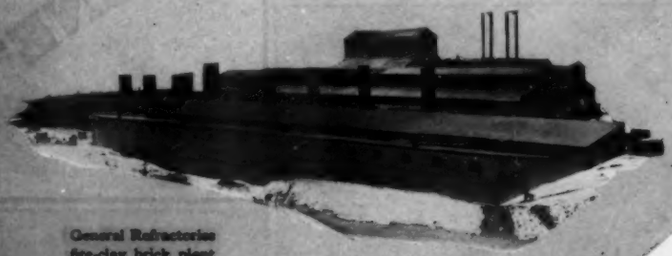
VICTAULIC COMPANY OF AMERICA
26 Broadway New York

Please send Victaulic Bulletin No. 7.

Name .....

Address .....

FOR CRUDE OIL — GAS — WATER — SEWAGE — COMPRESSED AIR — ETC.



General Refractories fire-clay brick plant at W. Decatur, Pa.

One of the quarries where highest grade ganister rock is selected.

Time-tested methods insure the highest quality of refractories

Brick, drying preparatory to setting in kiln.

Modern Laboratory devoted to maintenance of standard quality and development of refractories best suited to meet unusual service conditions.

In shipping the finished product, a most careful inspection is made.

In the rapid development of modern high duty furnaces the highest quality of refractories is essential to meet the changing conditions.

This highest quality of refractories is insured by the General Refractories Co. by careful control from raw materials to finished product.

In company-owned mines and quarries the raw materials are carefully selected and checked by men of experience. In the 15 General Refractories Co. plants, the most modern equipment and methods, proved most practical from years of experience, are used.

At the General Refractories Laboratory daily tests are being conducted to insure uniform quality. Actual plant operating conditions are reproduced to determine materials best suited to customers' requirements.

These time-tested facilities, combined with our many years' experience in meeting every refractory need, give assurance of most satisfactory results in actual service.

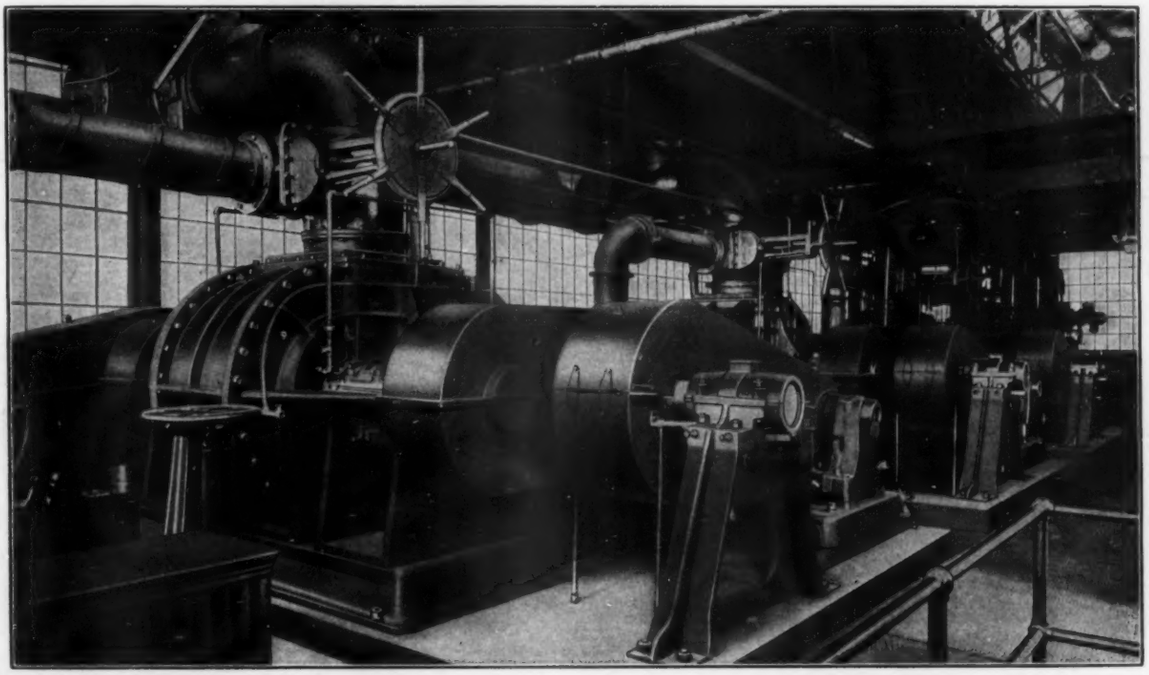
GENERAL REFRACTORIES COMPANY

106 South 16th St., Philadelphia, Pa.

Boston, Buffalo, Chicago, Cleveland, Detroit, New York, Pittsburgh, San Francisco
Seattle, Wash. (Representative—F. T. Crowe)
Montreal, Canada (Representative—Webster & Son Ltd.)

3310A

ROOTS



ROOTS

Three Roots No. 11 Heavy Duty Gas Pumps each delivering 37 Cubic Feet per Revolution against 10 lbs. Pressure in Central West Plant.

Roots Service

Roots service is dependable, satisfactory service. From conception to the finished product every detail is carefully wrought and inspected.

Oversize shafts, heavily ribbed cases, adjustable self-oiling bearings, sturdy gears of *conventional* 14½° involute tooth design, exact clearances, and the absence of internal friction mean added service from Roots Gas Pumps.

Secure the best by specifying that it be a Roots product—regardless of whether you need a Gas Pump, Meter, Vacuum Pump, Liquid Pump, Blower, Gate, Valve or Coupling. Write for details.

The P. H. & F. M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle

THE above shows an installation of 48" plain end cast iron pipe connected with Dresser couplings. This installation has proven to be superior to all other types. The line has been in operation for some time. It is absolutely tight and has been unaffected by vibration or expansion and contraction. This line, like thousands of miles of other similar but smaller installations, will remain permanently tight, and free from maintenance expenses. The couplings are equipped with lead tipped gaskets.

S. R. DRESSER MANUFACTURING COMPANY
Bradford, Penna.

DRESSER
Couplings Dominate

{ Reynolds }

. . . In every field of human activity, there is always one who leads . . . the reward is widespread acceptance. ¶ And when a product achieves the goal of being the accepted standard, it is only natural that it is the basis of trade comparison. ¶ However, the Leader remains . . . *the Leader.*

Reynolds
Gas Regulator Company
Anderson, Indiana

Representatives:

Eastern Service Company, Boston, Massachusetts • F. E. Newberry, Avon, New Jersey
Thomas C. Corin, Detroit, Michigan • Gillespie & Schwan, Inc., Dallas, Texas

The BARTLETT HAYWARD CO.

Engineers and Founders

BALTIMORE and NEW YORK

DESIGNERS AND BUILDERS OF:

Carburetted Water Gas Plants
Complete Coal Gas Plants
By-Products Plants
Salt Water and Fresh Water Condensers
De Brouwer Charging and Discharging Machines
Purifiers - Steel Tanks - Shaving Scrubbers
Vertical Waste Heat Boilers
Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, *Editor*

A Fitting Recognition

THERE IS something genuinely inspiring in the Consolidated Gas Company of New York's action in naming one of its largest gas maunfacturing plants after the late John O'Connell. Indeed, he would be a callous individual who did not contemplate such a gesture with at least a trifle of emotion and a renewed desire to make our industry stand for service in the fullest sense of the word.

Picture an humble worker giving continuously seventy-two of his nearly ninety years of life in carrying out the various tasks incident to his daily routine in the gas works and you have visualized nothing short of a saga of the industry.

What a thread of romance runs through the gas industry in these seventy odd years! The output of gas grown to staggering figures. Old and former methods fairly revolutionized. The guttering corner gas lights, which must have been an integral component of John O'Connell's artistic conception, practically a thing of the past and their place taken by vaster markets. Back breaking toil giving way to highly mechanized apparatus for furnishing a continuous fuel service to the public. All of these developments O'Connell saw pass in review during his career. Moreover, in his own company, he doubtless saw emergency after emergency arise only to be surmounted by an iron will to leap the obstacle and carry on. And unquestionably this old veteran on many occasions did yeoman duty in helping to weather the storm in times of stress. Call him a gas house terrier if you will for in the doing you have truly conferred on him a title of distinction and affection.

Certain individuals might say that this or that gas company is interested in supplying its employees with medical service for the reason that a healthy employee will do more and better work and is therefore a better money maker for the company. Or, they might contend that pensions, social diversions, vacations and the like are granted the employee sans sentiment and merely to keep him satisfied with his work and thus lessen employee turnover. But, by no stretch of the imagination can such persons ascribe any ulterior motive to the naming of a large gas works the "John O'Connell Plant." The action is nothing less than an honest and fitting recognition of such work that thousands of the more humble workers are performing in the gas industry in the interest of service.

We live in a world of drive and hustle, one that at times seems devoid of sentiment, but we can console ourselves with the thought that the recognition the industry has accorded one from the ranks stamps it as a rather fine sort of business to be connected with.

Open Season for Hawking

IN THE SPRING the gas man's fancy rightly turns to thoughts of merchandising and at once he is diligently plied with a great conglomeration of nostrums which will painlessly and effectually rid him of any winter selling lethargy and bring the healthy glow of bumper business to his sales force. At least, so the testimonials aver.

Now that he's loaded for big game will he use the right ammunition?

It is the gala season we frequently hear rumors of impending dire ailments that will just about render us excellent subjects for the for hawking and concurrent with alleged cure-alls business grave digger; quackeries and specifics to the contrary, notwithstanding.

An old bogy that rears its humorous head at this time, with the accompaniment of a flowery "send-off," is the matter of heating water for household uses by electricity.

This process is recommended to the householder sugar-coated with a time clock and the carrying out of the heating process during the night or off-peak hours. In other words, at a definite, pre-arranged hour a time clock will throw on a switch and electricity will proceed to heat the water. Then at another prearranged time in the morning the clock will act in the reverse, shut off the current and the householder will have her hot water for the day's use. Obviously this hot water will be stored in a well insulated tank. At all events, by using the current during off-peak hours and having it measured through a separate meter, the customer will enjoy the benefits of a very low kilowatt-hour rate.

The testimonials accompanying this water heating scheme usually narrate how a number of European communities have gone in for this sort of thing, and thereby have been enabled to electrically heat their water on a cost basis quite comparable with the gas method.

In passing a few remarks on the subject of water heating by electricity it should be noted that Europeans do not use anywhere near the quantities of hot water that Americans do. Hence, in order to guarantee sufficient hot water for the entire day's needs in the home and at the same time obviate additional heating of water during the on-peak hours, a sizable and extremely well insulated tank would have to be employed.

Further, mechanically and otherwise, it is just as simple a matter to rig up a gas-fired water heating system with a time clock actuating a gas valve as is the case in the electrical unit; thereby permitting the use of gas during its off-peak hours.

As a matter of fact the housewife's water heating fancies vary so greatly in variety and time of application that it would seem that off-peak water heating is not as yet to be given an undue amount of consideration. Nevertheless, it is comforting to know that we can adapt our water heating units to any extent that the electrical man can should the need ever arise.

Is This The Answer?

IT IS AT TIMES interesting to get an outsider's view of the way we conduct our business, for often such an individual can detect moves and checkmates on the board that are skipping our notice.

We recently had the good fortune of hearing a valuable line of reasoning advanced by a competent student of housekeeping trends and shifting conditions. This had to do with a subject very much in evidence in the minds of the majority of gas men; namely, the proposition of increasing the cooking load. Herewith is given in part the seemingly logical reasoning employed by the gentleman in question.

After discussing the fact that housewives are increasingly buying more foods that are entirely or partly cooked, as well as touching upon the matter of more meals being eaten away from home, he emphasized the well known fact that appliances and cooking utensils are attractive, efficient and labor saving. Further, he advanced the contention that, all other things being equal, the housewife still clings to a very worthwhile desire to prepare tasty, appetizing and, indeed, artistically planned dishes and meals.

"What then," questioned this man, "is the deterrent factor?" And in answer he maintained that dishwashing constitutes the fly in the ointment. Incidentally, he substantiated his contention by admissions from a number of representative housewives with whom he had discussed the problem.

In a nutshell, he held that most housewives take an

interest in preparing the meals but absolutely draw the line at washing the dishes; a none too attractive anti-climax, in a sense.

If this thought is valid for a great majority of people it would seem that the remedy consists in devising some scheme for drawing the teeth of the objectionable feature; perhaps by developing a satisfactory dish-washer or even a cheap dish and plate covering that could be thrown away after the meal. Such coverings of a transparent nature are now widely employed to form a wrapping for moist and sticky foodstuffs in package form.

Nevertheless, there seems to be a field for a really successful dishwasher, if not gas, at least electric. In this latter case, particularly with combination companies, a mutually profitable cooking scheme for the home kitchen could be worked out.

Low-Temperature Coking on a Commercial Scale

AT NEW BRUNSWICK, N. J., in the new K. S. G. plant for low-temperature processing of coal, one finds a most intriguing economic and engineering development. It seems certain that many branches of the coal-products business are to learn a great deal from this first American application of this particular process. Elsewhere in this issue will be found a brief plant description and an outline of the tie-in between this plant and related industries. One can see from the relationships there described how large this undertaking is and how completely a corporation must organize its affairs when it enters a field that affords such new and radically different products as low-temperature tars and oils, low-temperature coke, and the very rich low-temperature gas.

As yet no operating results are obtainable from the plant, since thus far only two of the eight units are operating and these only for a very brief period. On a later occasion, the Journal hopes to present more completely the summary of operating results, but for the present, it commends to careful consideration of all interested in coal products a study of the new plant and its industrial interrelations.

Interpreting the Company to Stock Holder and Employee

FEW GAS COMPANY employees have a well balanced and comprehensive understanding of all departments' activities. Such lack of understanding is often the cause of inter-department friction, or even of erroneous statement to outsiders. Still fewer stock holders know how elaborate a business is involved in the making and selling of gas. They, too, become more interested in the company whose securities they hold and more loyal supporters of its management if they can be educated along sound lines.

In the February number of its *Gas and Electric News*, the Consolidated Gas, Electric Light, and Power Company of Baltimore, has done an unusually fine job of interpretation of the gas industry. This little magazine, which in many respects is a model house organ, portrays the manufacture, distribution, and utilization of gas in a most inspiring fashion. The editor has succeeded in making a technical matter both clear and attractive. This is a result seldom attained for the gas industry.

Other company executives who feel the need for spreading among employees and stock holders a better understanding of their corporations' affairs will profit greatly if they procure and critically analyze this particular number of the Baltimore monthly. It has a lesson in it for every division head, from general manager to street-gang foremen.

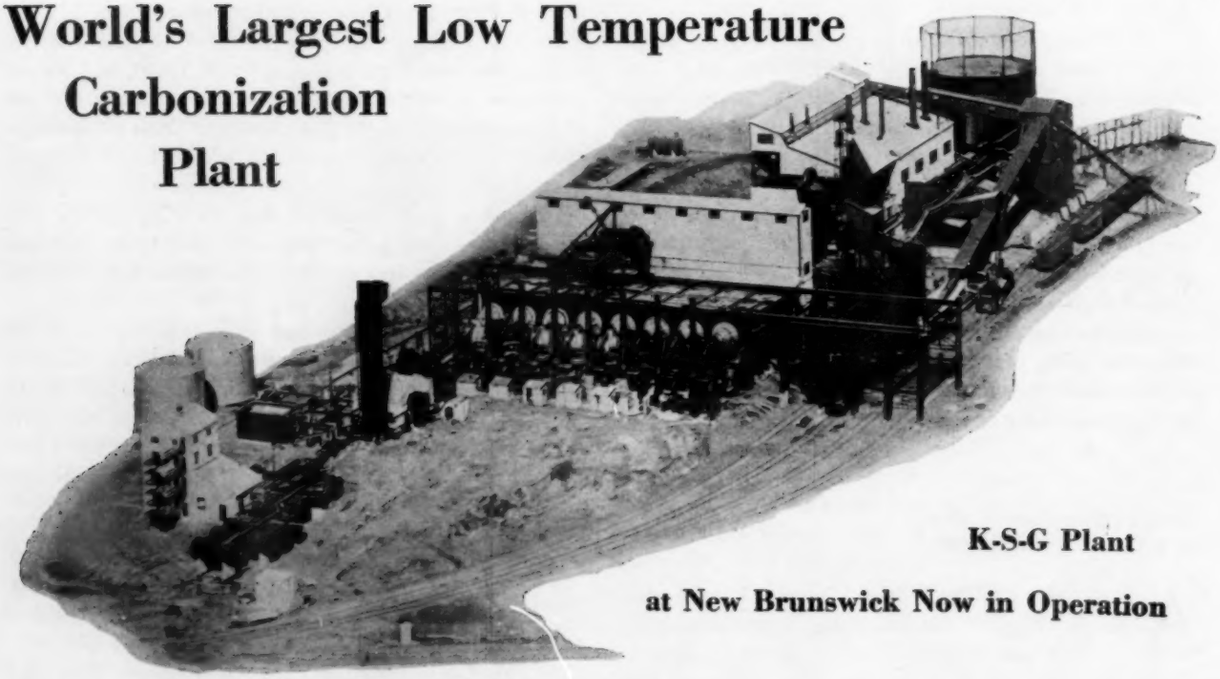
Solving the Problem of "Standardized" Standards

STANDARD METHODS, so called, are to be found in every gas-works laboratory. But these standards differ from company to company and the results obtained by these procedures are far from uniform. It has long been recognized that a national standard of testing procedure should be set up so that results obtained in testing raw materials, by-products, and gas would be comparable throughout the country. Without such uniformity in significance inter-company comparisons are, of course, impossible. With such uniformity of all companies, data can be utilized whenever available and applicable to the problem in hand.

The new edition of the Gas Chemists Handbook, now available from the American Gas Association, affords a splendid new impetus toward uniform testing procedures. Gas-company executives should welcome this volume as an aid toward good laboratory practice and significant test results. They should see to it that their own company laboratories use the methods prescribed by the Handbook wherever possible, only varying when peculiar local conditions necessitate special procedures different from these national standard testing methods.

With the intensive competition which gas suffers from other fuel and energy sources, no effort should be spared in making every useful fact available to the gas-company management. Neglect of proper testing methods will often deprive the executive of needed comparisons with other companies results. It seems, inevitable, therefore, that the new Handbook will be cordially welcomed and that it should be diligently followed throughout the country.

World's Largest Low Temperature Carbonization Plant



K-S-G Plant

at New Brunswick Now in Operation

THE New Brunswick, New Jersey, K-S-G plant, with an annual capacity of nearly a quarter of a million tons of coal, is the largest low-temperature carbonization plant in the world.

The K-S-G process takes its name from the Kohlenscheidungs-Gesellschaft (literally "Coal Separation Company"), a subsidiary of International Combustion Engineering Corporation. This company has operated the original K-S-G plant at Karnap, near Essen, Germany, for the past five years, and is now enlarging this installation.

The New Brunswick plant was designed and built by the International Coal Carbonization Company, and will be operated by the New Jersey Coal and Tar Company. Both of these companies are subsidiaries of International Combustion Engineering Corporation.

Aims of Process

The K-S-G process is designed to produce from bituminous slack in a single operation a smokeless, free-burning fuel which can be screened into the ordinary domestic sizes, together with the usual yields of low-temperature tar, light oil and high calorific value coal gas.

The semi-coke is marketed under the registered name of "Disco"—from "Distilled Coal." It burns with a short blue flame and is entirely smokeless. Being porous in structure, it is much easier to ignite than either anthracite coal or high temperature coke, and responds more quickly to changes in draft.

From each ton of coal there are obtained 1500 lb. of semi-coke, 25 gallons of tar, 3500 cu. ft. of rich coal gas (about 900 B.t.u. per cu. ft.) and 2 to 3 gallons of light oil. About 80% of the semi-coke is recovered in salable sizes. The balance is consumed in making producer gas to underfire the retorts and in generating steam for process and power.

Calorific Value of Gas

The New Brunswick plant has a contract with the Public Service Gas and Electric Corporation of New Jersey for the delivery of a minimum of 3,000,000 cu. ft. per day of gas having a calorific value of 535 B.t.u. cu. ft. Since the K-S-G retort is externally heated by producer gas, the entire production of rich gas is available for sale. This is mixed with 300 B.t.u. blue gas, made from bituminous coal, so that the mixed 535 B.t.u. gas amounts to about 8,000 cu. ft. per ton of coal carbonized.

The tar and light oil are sold to the International Combustion Tar & Chemical Corporation a subsidiary of International Combustion Engineering Corporation at a figure in excess of the current market for high-temperature tar. Upon distillation it yields a wood-preserving creosote oil—the tar refiner's most important product—ten times as toxic as the best competitive oil now on the market. Low-temperature coal tar, moreover, is particularly valuable because of its high content of phenols. As compared with high-temperature carbonization, there is recovered from a ton of coal more than five times the volume of phenols suitable for manufacture into synthetic resins of the bakelite type. There is now developing for this remarkable material a tonnage market involving the production of furniture, doors, wainscoting, and interior trim.

In addition to the light oil scrubbed from the gas about 5 gal. more can be distilled from the tar. As a motor fuel, this material has been found to exceed coke-oven benzol in anti-knock value.

The New Brunswick plant consists of eight retorts.

Each retort has a rated capacity of 80 tons of coal per day, but it is believed that this rating is conservative, as the Essen plant at times has reached a throughput of 100 tons of coal perday.

Description of Retort

The K-S-G retort consists of two concentric drums, externally heated, inclined slightly from the horizontal, and rotated at three-quarters of a revolution per minute on the bullrings at each end. The outer drum is 72 feet long with a 10 foot diameter, while the inner drum is 85 feet long with a 5½ foot diameter.

The retort weighs about 160 tons. The outer drum is made of open-hearth steel in three sections. The end sections are of ⅞ inch plate, while the middle section is of 1 inch plate. All longitudinal and circumferential seams are hammer-welded with water gas and annealed. The circumferential seams are reinforced with welded bands 2 feet wide and 13/16 inch thick. The inner drum, having a smaller section, is made of 1 13/16 inch plate. It is also made in three sections with all seams hammer-welded with water gas. The reinforcing bands at the circumferential seams, however, are both riveted and welded.

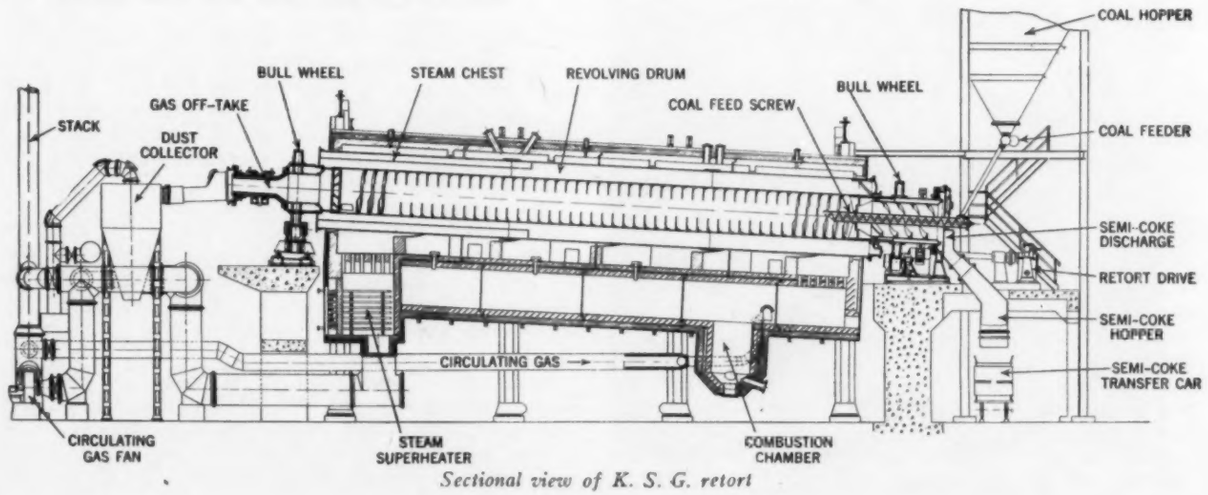
The raw coal is fed continuously from the storage bin into the retort through a screw conveyor. It is carried by the helical flanges in the inner drum to the upper end, where it spills through open ports into the outer drum. Upon gravitating to the lower end of the retort, it is picked up as semi-coke by a series of scoops, dropped on to a receiving plate and carried by the reverse helical flanges to the discharge gate. The total time that the fuel is in the retort is about two hours. The coal gas escapes through the drum head and the off-take pipe at the upper end of the retort.

The principle involved in the double drum arrangement is that of reducing to a minimum the period of time that the fuel is in the plastic state. The coal during its passage through the inner drum is dried and heated to a point below its softening temperature. It is then plunged into the upper end of the outer retort, where the highest temperatures are maintained. Each individual coal particle is thus almost immediately "case-hardened", so to speak, with a layer of non-sticky semi-coke, so that its agglomerating properties are correspondingly reduced. While the heating system is not of the popular counter-current type, ample provision has been made to recuperate the heat in the stack gases.

The second means taken to prevent carbon deposits on the walls is the introduction of steam through a series of steam chests. There are eight of these chests extending along the inner wall of the outer drum for the upper third of its length, but by means of an automatic valve the steam is admitted only through those which are actually under the fuel bed. The direction of the steam is tangential, so that a screen of vapor is continuously interposed between the fuel and the retort walls. As a final precaution, a number of chains are stretched longitudinally in the upper end of the outer retort, so that any adhering carbon is scraped off. This method of dealing with a coking coal has been so successful that the K-S-G retort near Essen has never had to be taken out of service for cleaning.

Retort Heating Problem

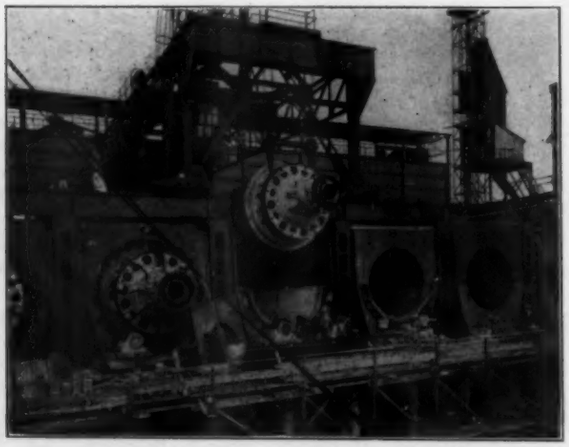
The problem in heating the retort is to obtain variable temperature control and a high thermal efficiency. Moreover, since the retort is made of steel, it is necessary to maintain a neutral atmosphere to prevent oxidation. As mentioned above, the cheapest possible gaseous fuel is used, which is hot producer gas made from the semi-coke fines. This is generated in a central producer gas plant, but each retort has an independent heating system. The gas is burned in a combustion chamber, where gas and air are admitted through two proportioning burners in exact combining ratio. Consequently a temperature of about 2,500°F. is obtained at this point, which is considerably higher than that desired in the retort flues. Rather than use excess air for cooling, with resultant loss of thermal efficiency and oxidation of the retort, the stack gas recirculation system is employed. In this system a circulating fan takes a portion of the flue gases from the base of the stack, mixes it with some of the hot gases from the combustion chamber and forces it into the first pass at the lower end of the retort setting, where a temperature of about 1,200° F. is maintained. The flow of this mixed heating gas is baffled to make it take a helical course around the retort. The heat abstracted from it by the carbonizing coal is replaced by introducing hot combustion chamber gas into each pass through ports connecting with a central flue running longitudinally under the retort. The dampers in these ports are so arranged that increasingly higher temperatures are maintained in each pass, reaching 1,350°F. in the uppermost pass surround-



Sectional view of K. S. G. retort

ing that part of the retort where the coal falls from the inner to the outer drum.

The hot gases leaving the retort setting pass directly into the steam superheater, thence through the jacket around the dust catcher, (which is heated to prevent condensation of tar), and into the stack. The superheater is a nest of alloy steel tubes. From 100 to 200 pounds of exhaust steam per ton of coal are raised by the superheater to a temperature of 900° F. Since this steam leaves the retort at almost the same temperature, it does not contribute to the heat of carbonization. Its function is both to prevent carbon formation on the retort walls and to prevent excessive cracking of the tar vapor. The gross heat of carbonization is about 800 B.t.u. per pound.



K. S. G. Retort being lowered into position

The coal gas, tar vapor, and steam leaving the retort pass first through a dust-catcher. The amount of dust collected is less than 0.1 per cent of the coal processed and no difficulty is experienced with emulsions, dehydration being satisfactorily accomplished by simple settling. The pressure in the retorts is maintained constant by an automatic control system, acting through dampers in each of the coal gas off-take lines and the governor of the exhauster.

Units Are in Duplicate

All units are built in duplicate, so that one spare is always available. There are two producers, equipped with rotating bottoms for automatic ash elimination and water-jacketed for waste-heat steam generation. The water-gas plant comprises two 11 foot generators, hand-clinkered, but automatically charged, with waste-heat boilers for the stack gases. While this plant will make only blue gas in regular operation, each set is provided with a carburetor and superheater. Thus, in the event of any interruption in the operations of the retort house, the blue gas can be enriched by oil gas instead of coal gas.

The steam plant consists of two 500 h.p. boilers, operating at 200 pounds pressure and equipped with stokers to burn semi-coke breeze. Since both the producers and the blue-gas generators are nearly self-supporting so far as steam requirements are concerned, the main function of the boiler plant is to supply steam for motive power. Steam is used to drive the coal gas exhausters, the engines rotating the retorts, and the various tar and oil pumps. Compared with electric operation, not only is greater flexibility of speed thus made possible and greater assurance obtained of continuity of operation, but also exhaust steam is made available in quantity nearly sufficient to meet the requirements of the carbonizing process.

The semi-coke from the hot cars is raised and discharged into the dry quencher, which is simply a container through which cold inert gases are circulated. No attempt is made at New Brunswick to generate waste-heat steam, as in the usual application of dry-quenching to high-temperature coke. The operation justifies itself merely on the ground of thorough and uniform cooling of the semi-coke to less than 200° F., which is well under its ignition temperature, without having to resort to drastic water quenching and the resultant production of wet coke and increase in the percentage of unsalable fine sizes.

An inclined conveyor carries the quenched semi-coke to the coke-screening house. Here the semi-coke is screened into the usual domestic sizes, ¾ inch being the smallest size to be offered for sale. Hoppers for three marketable grades are installed, with provision for discharging into either railroad cars or motor trucks. Of the semi-coke sizes smaller than ¾ inch, the ¼ to ¾ inch is used for producer fuel and the under ¼ inch for boiler fuel. It has been the experience at Essen that 80 per cent of the run-of-retort semi-coke is recovered in lumps larger than ¾ inch.

The coal gas passes through a primary cooler of the indirect type to the exhauster and thence through a scrubbing tower for removal of the lightoil. The blue gas purification train consists of a primary cooler, a relief holder, and a secondary cooler. The coal gas and blue gas are then combined in an automatic proportioning valve and pass through sulphur purification boxes to the storage holder of the New Jersey Public Service Electric and Gas Company on an adjacent property.

Detailed operating data from the New Brunswick plant will not be released until completion of the first year's operation.

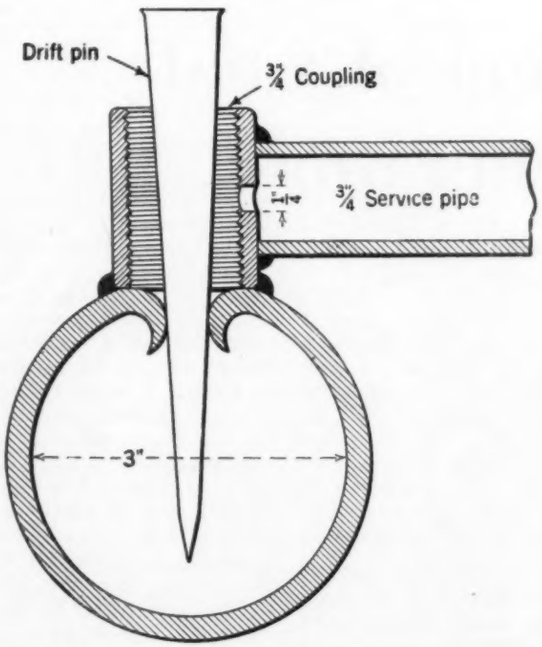
A seven-retort K-S-G plant now under construction at Coatesville, Penna., will be operated by the Pennsylvania Coal and Tar Company under a similar arrangement. It will sell the rich gas directly to the Lukens Steel Company without mixing with blue gas.

Service Connections For Gas Mains

Some gas companies distributing gas locally in districts which are being quickly built up have occasion to make service connections often and rapidly. They put in a main gas distributing line in a section where there are no houses at all, and before many weeks have elapsed there are requests for service connections in several places along the line.

This is the system used on one of the large gas manufacturing and distributing companies in the East for welding house connections to its mains which are carrying city gas under pressure. The mains are all made from steel pipe with ox-welded joints and the service connections are made up from steel pipe of a smaller diameter.

Each service wagon carries a number of standard ¾-in. steel or wrought iron couplings in which have previously been drilled on one side a ¼-in. hole. The service wagon men have already measured the length of pipe needed to reach from the main to the curb where



a reducing valve is located and also from the reducing valve to the house and to the meter. If these lengths are longer than standard lengths two or three are welded together as necessary. This makes but two lengths of pipe to be carried on the service truck when a line is to be installed from the main to the meter in the customer's basement.

On arriving at the house where the service connection is to be made, the house length is joined to the meter, the reducing valve is installed and the length from the valve to the main is put in place. Then one of the ¾-in. couplings is oxwelded to the end of the service line with a fillet weld. When this is finished the welder can be sure that he has a tight, leakproof joint. The lower end of the coupling is then oxwelded to the top of the main with a fillet weld similar to the other joint. The detail of this service joint is shown in the sketch Fig. 1. Upon completion of the welds, the pipe is pierced and the end of the coupling is plugged with an ordinary screwed plug, and the service connection has been installed.

Piercing methods depend upon the pressure of the gas carried in the line and on the size of the pipe wall. In low pressure gas lines it is considered good practice to drill the opening for the service connection. High pressure lines can be either pierced or drilled, depending upon the size of the pipe wall. In the larger sizes, that is, pipe over six inches in diameter, the pipe walls are fairly thick and it is best to drill them.

The company mentioned has one three-inch main which carries gas at a pressure of about 15 lb. per sq. in. The small sizes of pipe like this three-inch line have comparatively thin walls and in piercing these the procedure is as illustrated. A drift pin having a sharp, hardened point is used. The point is inserted in the coupling as shown and hammered with a heavy hammer until a hole is pierced in the pipe. The drift is then driven in until the hole is about ¼ in. in diameter. This opening being large enough to let the gas out, the drift is quickly removed and the plug slipped into place and screwed tight; the result is a trouble-proof connection, made with very little labor. The drift pin is particularly useful for this work and if all connections are to be made in pipe of small diameter and thin walls, it saves carrying around a large drill to make the holes.

—Oxy-Acetylene Tips.

One Mistake in Half a Million Chances

Five meter readers of the Peoples Gas Company, Chicago, were recently given cash awards for perfect meter reading records during the year 1928. The five men read 214,473 meters without making a single mistake. One other employe of the same department received a lesser award for his nearly perfect record of 60,518 meters with but one error charged against him during 1928.

The records of the men are all the more remarkable because, in addition to the number of chances for errors in meter reading, they had the same number of chances to err in subtracting the consumption of gas—therefore the men were perfect in 428,946 chances and the sixth member of the department made but one miss in 121,036 chances.

Vice-President George F. Mitchell presided at the presentation meeting, participated in by the entire force of meter readers. Mr. Mitchell voiced an appreciation of the meter readers' work, recounting the start of the special award system one year ago when a meter reader received a cash award for reading 61,855 meters, making but two errors in subtraction. Work of this nature, said Mr. Mitchell, meant good service to the public, a fact that inspired a wish that the men continue the practice of hanging up perfect records in reading gas meters.

The names of the men and their records follow:

Frank M. Erickson, Jr., read 70,261 meters without an error
James A. Pink read 55,694 meters without an error
Edward Carlin read 46,145 meters without an error
Charles T. Jennings, read 24,737 meters without an error
William H. Morgan read 17,636 meters without an error
Total 214,473 meters read without an error
Harry Shanks read 60,518 meters and made one error.

Record-breaking Meter Readers

The Gasification of Coal In The Generator

By Fritz Morawski

Das Gas Und Wasserfach, 1929, pages 149-154

CONTINUOUS gasification of coal is carried out in practice in the generator in three different ways, viz., gasification with air alone, gasification with air and steam, and gasification with air and flue gas, containing carbon dioxide. It is also possible to use a mixture of air, steam and flue gas in the process. It may be mentioned that the first process is used occasionally only on non-caking coal. In order to obtain a clear picture of the three processes, it will first be assumed that pure carbon is being converted into gas.

The similarity that exists between the production of water gas and producer gas makes possible the application of basic principles common to both. There are thus a number of fundamental principles and methods of calculating efficiencies, compositions of gas, steam and air required, and also bases for the determination of the best quality of gas to manufacture which can be applied both to the manufacture of water gas and producer gas. The article which follows is concerned at times more essentially with producer gas than with water gas, but the principles that are developed and the general operating information that it contains are applicable to water gas manufacture as well. Thus, this article should appeal both to the water gas man and also to the coal gas man who uses producers for the production of a fuel used in underfiring the retort and chamber furnaces.—Editor.

Gasification With Air Alone

One pound of carbon requires for gasification 1.33 pounds of oxygen and 4.45 pounds of nitrogen, or 15.1 cubic feet of oxygen and 56.9 cubic feet of nitrogen or 72.0 cubic feet of air. A gas is thereby obtained containing 29.9 cubic feet of carbon monoxide and 56.9 cubic feet of nitrogen, making a total volume of 86.8 cubic feet.

The heating value of this gas at 32 degrees F is 1.865 x 3050 or 5688 kilogram calories, equivalent to 9560 B.T.U. Inasmuch as the heating value of carbon is 14600 B.T.U., the difference in the heating values of 5040 B.T.U. is the sensible heat contained in the gas, and this causes a temperature of 1318 degrees C or 2340 degrees F, when it is assumed that the specific heat of the gas between 32 and 2404 degrees F (that is of carbon monoxide and nitrogen) is 0.038 per cubic foot. When this gas is burnt, a flue gas is obtained containing 29.9 cubic feet of carbon dioxide and 114.8 cubic feet of nitrogen. In this manner the total heating value of the coal is set free and the combustion temperature which is finally obtained is calculated to be 4085 degrees F, when the average specific heat of nitrogen and carbon dioxide between the temperature of 32 and 4372 degrees F is assumed to be 0.064 per cubic foot and 0.0402 per cubic foot respectively.

Gasification With Air and Steam

It is assumed that air at a temperature of 140 degrees F saturated with steam is used for gasification of the coal. One pound of air will therefore contain 0.159 pound of steam. One pound of carbon requires for gasification 57.5 cubic feet of air and 0.57 pound of steam. The gas, which is formed has the following composition; 29.9 cubic feet of carbon monoxide, 11.3 cubic feet of hydrogen and 35.3 cubic feet of nitrogen, making a total of 76.5 cubic feet.

The heating value of this gas at 32 degrees F is 1.865 x 3050 + 0.73 (2560) or 7488 kilogram calories, equivalent to 13600 B.T.U. When this value is subtracted from 14600 B.T.U., there are obtained as sensible heat 1000 B.T.U. Hence the temperature of this gas, when it is assumed that the specific heat of the hydrogen, carbon monoxide, and nitrogen is equal to 0.036 B.T.U. per cubic foot, becomes equal to 400 degrees C or 752 degrees F. A flue gas is obtained from the combustion of this gas which contains 29.9 cu. ft. of carbon dioxide, 11.4 cubic feet of nitrogen and 0.57 pound of steam.

In this case as well the total heating value of the coal, amounting to 14600 B.T.U. per lb., is again set free and the temperature of combustion obtained is 2082 degrees C or 3780 degrees F, when the specific heat between the temperatures of 32 degrees F and 3812 degrees F amounts to 2.36 B.T.U. per pound in the case of steam and 0.0627 B.T.U. per cubic foot in the case of carbon dioxide and 0.0398 B.T.U. per cubic foot in the case of nitrogen.

Gasification with Air and Flue Gas

If, for example, a flue gas containing 6.4 cubic feet of carbon dioxide and 24.1 cubic feet of nitrogen is added per pound of carbon to the air, then it is found that there are required approximately 3.2 cubic feet less of oxygen in the air, hence 11.9 cubic feet of oxygen and 44.5 cubic feet of nitrogen together, and hence 11.9 cubic feet of oxygen, 68.8 cubic feet of nitrogen and 6.4 cubic feet of carbon dioxide.

A gas is therefore obtained containing 1.865 + 0.4 or 2.265 cubic meters of carbon monoxide (or 36.3 cubic feet and 68.8 cubic feet of nitrogen making 105.1 cubic feet all together.

The heating value of this gas at a temperature of 32 degrees F is 2.265 x 3050 or 6908 kilogram calories, equivalent to 12500 B.T.U. The difference between the heating value of one pound of carbon and this figure is 3100 B.T.U. which is the sensible heat contained in the gas.

When the specific heat of carbon monoxide and nitrogen is assumed to be 0.036 B.T.U. per cubic foot between the temperatures of 32 degrees F and 1112 degrees F, then the temperature of the gas is determined to be 1013 degrees F. When this gas is burnt, a flue gas is obtained containing 36.3 cubic feet of carbon dioxide, and 137.6 cubic feet of nitrogen, making a total volume of 173.9 cubic feet. Here again the total heating value of one pound of carbon is set free and when the specific heat of carbon dioxide between the temperatures of 32 and 3452 degrees F is assumed to be 0.0622 B.T.U. per cubic foot and that of nitrogen 0.0393 B.T.U. per cubic foot, the temperature of combustion is found to be 3469 degrees F.

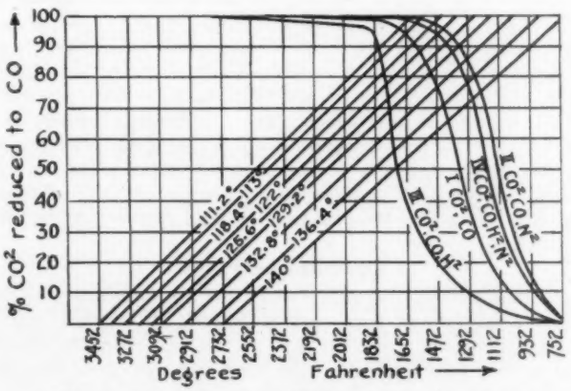


Fig. 1—Conditions of equilibrium for various gases

Hence, from the purely theoretical standpoint, on the basis that none of the sensible heat in the gas is set free, the same amount of heat is obtained from the gas in all three methods of gasification, and this is naturally equal to the heat value of one pound of carbon or 14600 B.T.U. On the other hand, the temperature of combustion is very different, and, inasmuch as this plays an important role in the efficiency of the oven, the gas made with air appears to be the best and that made with the addition of flue gas to the air the worst.

Consideration is not taken of the dissociation of the carbon dioxide and water in the calculation of the temperature or combustion, which naturally causes a certain reduction in the combustion temperature. Inasmuch as this discussion is concerned not so much with the determination of absolute values but rather with a comparative study of the effects obtained in the three different methods of gasification, the values found may be used without further change.

It is, however, not possible to bring the entire sensible heat of the gas into the combustion space without some loss which is incurred in the generator itself and in the gas lines, and the extent of this loss is greater the higher the temperature of the gas. It often happens that this loss of heat is desirable in using moist fuels for separating out the moisture in the gas, and at times this effect is artificially produced, as in the purification of gas. It must furthermore be considered that most ovens heated with gas are provided with regenerators or recuperators and so much waste heat is available that the heat in the gas itself does not add any advantage to the operation. The following calculations are accordingly made on the basis of a cold gas.

In the first case when air is used alone for the gasification of the coal, the temperature of combustion is determined to be 1648 degrees C or 2998 degrees F. This figure is derived on the basis of 10250 B.T.U. per pound carbon as the heating value of the cold gas, or 118 B.T.U. per cubic foot. The composition of the gas is 34.7 per cent carbon monoxide and 65.3 per cent of nitrogen. The specific heat between the temperatures of 32 degrees F and 2912 degrees F for carbon dioxide is 0.0609 B.T.U. per cubic foot and 0.0387 B.T.U. per cubic foot for nitrogen.

When both air and steam are used, the heating value of the cold gas per pound of carbon is 13500 B.T.U. and 176 B.T.U. per cubic foot. The composition of the gas is now 39.1 per cent of carbon monoxide, 14.8 per cent of hydrogen and 46.1 per cent of nitrogen. The combustion temperature is 3540 degrees F on the basis of 0.0622 B.T.U. per cubic foot as the specific heat of carbon dioxide between 32 and 3452 degrees F, 0.0394 B.T.U. per cubic foot in the case of nitrogen and 0.0636 B.T.U. per cubic foot in the case of water vapor.

When air and flue gas are used, the heating value of the cold gas is 12500 B.T.U. per pound of carbon and 108 B.T.U. per cubic foot. The composition of the gas is 34.7 per cent of carbon monoxide and 65.3 per cent of nitrogen. The temperature of combustion is then 2991 degrees F on the basis of 0.0614 B.T.U. per cubic foot for the specific heat of carbon dioxide between the temperatures of 32 and 3092 degrees F, and 0.0389 B.T.U. per cubic foot for nitrogen.

It is seen from the foregoing that the gasification with the aid of air and steam gives by far the best results in the case of cold gas as far as the heating value of the gas and the temperature of combustion are concerned. These calculations have been made on the assumption that the entire moisture in the gas is decomposed and that all of the carbon is converted into carbon monoxide.

Tabulation 1

Weight Equilibrium of CO and CO_2 with C according to Boudouand

Temperature of °F	CO_2 %	CO %	CO_2 reduced to CO %
842	97.80	2.20	1.1
932	94.60	5.40	2.8
1022	88.—	12.—	6.4
1122	76.80	23.20	13.1
1202	60.20	39.80	24.8
1292	41.33	58.67	41.5
1382	24.08	75.92	61.2
1472	12.35	87.65	78.—
1562	5.95	94.05	88.7
1652	2.90	97.10	94.4
1742	1.23	98.77	97.6
1832	1.—	99.—	98.—

As far as the decomposition of the moisture is concerned, this is dependent on the temperature in the zone of incandescence in the generator or producer, the length of time that the moisture remains in contact with the coal and on the character of the coal itself. As may be seen from tabulation number 2, almost all

Tabulation 2

Weight Equilibrium of CO_2 CO and N obtained from combustion of C by air according to K. Neumann, Mayer and Jacobi

Temperature of °F	Gas composition % CO_2	CO	N_2	CO_2 reduced to CO %
752	20.6	0.9	78.5	2.1
842	19.2	2.9	77.9	7.—
932	17.1	6.4	76.5	15.8
1022	14.1	11.5	74.4	29.—
1112	10.1	18.1	71.8	47.2
1202	6.1	24.7	69.2	66.9
1292	3.1	29.4	67.5	82.6
1382	1.5	32.2	66.3	91.5
1472	0.6	33.7	65.7	96.5

the steam is decomposed at a temperature above 2012 degrees F. Inasmuch as higher temperatures exist in the incandescent zone in the producer and generator, it may be concluded that all of the steam is decomposed.

When it is found that undecomposed water vapor is present in the gas in the practical operation of the generator or producer, then this is due either to the addition of too large a proportion of steam to the air, which is also the cause of a decreased thermal value of the gas, or that channels have been formed in the mass of coal in the generator through which the steam passes undecomposed. When the air is moistened with steam, the steam pipe is often placed directly under the grate in order to avoid condensation losses. This prevents, however, a regular distribution of the steam in the air, and at those points where there is too much steam present, there is danger that the steam willnot be entirely decomposed. Even when it is assumed that a small percentage of steam remains undecomposed in the gas, the change in the temperature of combustion is inconsiderable. Thus, when the humidity of the air blown into the generator is 140 degrees F and twenty per cent of the excess steam is undecomposed, the theoretical temperature of combustion is reduced from 3583 degrees F to 3540 degrees F. It can be assumed that in the practical operation of the producer or generator practically all of the steam is decomposed.

The second assumption that all of the carbon is converted into carbon monoxide is another matter. It may be assumed for the present that carbon monoxide and carbon dioxide are formed simultaneously in the gasification process. Both nitrogen and hydrogen are of course also present. Carbon monoxide and carbon dioxide are therefore in a state of equilibrium in the presence of incandescent coal which equilibrium depends on the temperature, the partial pressure of these gases in the mixture, etc. Higher temperatures and lower partial pressures yield a gas which is richer in carbon monoxide and poorer in carbon dioxide. Thus in figure 1, curve I represents the condition of equilibrium for carbon dioxide and carbon monoxide according to the values given in tabulation I. Curve II is for air gas according to tabulation 2; curve III is for water gas according to tabulation 3. The influence of partial pressure can be told from a comparison of tabulations I and II and curves I and II. Curve IV represents approximately the condition of equilibrium for mixed gas. Inasmuch as the mixed gas consists mainly of air gas and as the partial pressure of carbon dioxide and carbon monoxide is only a little higher in the mixed gas than in the air gas, the curve for mixed gas must follow closely that for air gas.

It is understandable that a separate curve must be drawn for every condition of moisture in the air-steam mixture. The difference is so small that it is entirely proper to select an average figure. It can be assumed from these curves that originally only carbon dioxide is present, which is then partially converted into carbon monoxide. Additional curves are drawn in figure 1 which are based on various temperatures (saturated air, for example at 140 degrees F). The 140 degree F curve shows that a theoretical temperature of 2750 degrees F exists in the zone of incandescence in the case where a mixed gas is produced by means of saturated air at a temperature of 140 degrees F, when only carbon dioxide is formed at first. Then this carbon dioxide is reduced in amount to carbon monoxide proportionally with the temperature, so that when all of the carbon dioxide has been converted into carbon monoxide a gas temperature of 752 degrees F is obtained.

Equilibrium Point

These curves also serve when the assumption is made that a mixture of both carbon dioxide and carbon monoxide exists at the start and at the finish in the place of carbon dioxide only at the start and carbon monoxide only at the finish. At the upper limit, the point of intersection of these temperature curves with curve IV need only be considered. At this point the conversion of carbon dioxide into carbon monoxide is progressed so far that the equilibrium between the two is reached. Hence, no more carbon dioxide can be reduced by further decrease in the temperature.

These facts may be used as a basis for the correct, theoretical calculation of the composition of the gas, the heating value and the temperatures of combustion. These calculations are shown in diagrammatic form in figure 2. It is seen from this diagram that the maximum amount of combined heat is obtained theoretically in the gasification of carbon with the aid of moist air, air saturated at a temperature of 118 degrees F with a simultaneously obtained maximum combustion temperature of 3218 degrees F.

It is also seen from figure 2 that only when a definite

Tabulation 3

Decomposition of H_2O by Carbon (Charcoal) according to Harries

Temperature °F	Composition of Dry Gas H_2 %	CO %	CO_2 %	Steam Decomposed %	Steam Undecomposed %	Composition of Wet Gas H_2O %	CO %	H_2 %	CO_2 reduced to CO_2 %	CO_2 reduced to CO %
1245	65.2	4.9	29.8	8.8	91.2	87.12	0.63	8.41	3.84	7.6
1396	65.2	7.8	27.—	25.3	74.7	65.82	2.67	22.28	9.23	12.7
1540	61.9	15.1	22.9	41.—	59.—	47.15	7.96	32.77	12.11	24.7
1582	59.9	18.1	21.9	48.2	51.8	39.18	11.01	36.48	13.33	29.2
1749	53.3	39.3	6.8	70.2	27.2	17.21	32.70	44.43	5.66	74.3
1850	48.8	49.7	1.5	94.—	6.—	3.02	48.20	47.30	1.45	94.3
1940	50.7	48.—	1.3	93.—	7.—	3.68	46.31	48.84	1.25	94.8
2057	50.9	48.5	0.6	99.4	0.6	0.30	48.34	50.73	0.60	97.6

moisture content is found in the air-steam mixture can the mixed gas process be carried out in an economical manner, that the heating value of the gas per pound of carbon is about fifteen per cent higher than in the case of air gas, and that the temperature of combustion is also about twenty per cent greater than when air gas is burnt. As far as the carbon dioxide content of the gas produced is concerned, it may be mentioned that the larger proportion of this gas obtained in the practical, operation of the apparatus comes from the carbonization of the coal.

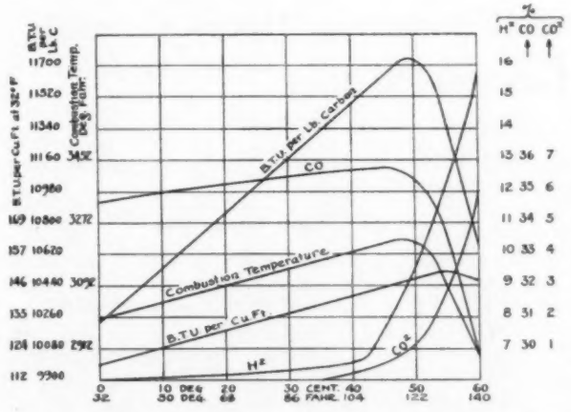


Fig. 2—Steam saturation temperature of air for gasification

Furthermore, when the generator or producer is provided with a watercooled jacket and when the grate is too large and hence a larger proportion of the gaseous stream rises along the walls of the water-cooled jacket, carbon dioxide is not reduced because of the low temperatures which pervail at these points.

When a mixture of air and steam is used in the operation of the generator or producer, there is naturally an additional cost due to the consumption of fuel for the manufacture of the steam. Thus, in the former example where 0.57 pound of steam was required for the gasification of one pound of coal, it was found that an additional 0.0422 pound of coal was required for the production of the steam, or an increase of 4.22 per cent. But, this figure must be increased to six per cent in order to take care of the losses due to the efficiency of the steam production being less than 100 per cent and to the condensation of steam in the lines. The waste heat boiler has been used to utilize the heat in the flue gases for the production of steam.

When a mixture of air and steam is used for the gasification of coal, there are two ways in which the process may be carried out, namely, first by moistening the air with steam, and second by moistening the air with hot water. The first process possesses several disadvantages over the second.

When steam is blown into cold air, this air must be heated up to the mixing temperature, which is only possible when a portion of the steam is condensed. This condensate is carried by the air current into the gas producing apparatus in the form of a mist or extremely finely distributed water bubbles. The water is then again vaporized at the expense of the gas making process. Thus a part of the available heat is rendered useless, this heat being converted into combined heat by the decomposition of the steam.

To continue the example selected above, every pound of carbon will require 57.5 cubic feet of air and 0.57 pound of steam for gasification. In order to heat 57.5 cubic feet of air from 32 degrees F to 140 degrees F, a quantity of steam must be condensed which is found to be 0.108 pound or ninteen per cent of the total quantity of steam used. The amount of heat required for this purpose is 258 B.T.U., which corresponds to an additional fuel consumption of 0.8 per cent. Due to the fact that condensation of steam also takes place in the lines and that this water is eventually mixed with the air entering the generator, the loss of fuel must be figured on a practical basis to be equal to one percent.

When the apparatus used for moistening the air with hot water is built in a correct form, this disadvantage is not incurred. The air after being saturated with moisture is dry.

Moisture Control Essential

An additional result of the precipitation of water when steam is used is that it is not possible to determine the quantity of moisture per cubic foot of blast by simply reading the thermometer, which can be done when warm water is used in the place of steam for moistening the air. However, inasmuch as the best quality of gas is obtained from any coal only when the moisture content of the air is at a certain optimum point, it is essential that the latter should always be controlled, which is not possible when steam is employed.

When a number of generators or producers are being fed with air moistened in a centrally located apparatus, the air blast saturated with the condensate has an opportunity to precipitate a portion of the water in the lines, and the result is that the generator which is located farthest from the air moistening apparatus will be fed with air which does not contain sufficient moisture. This is the reason why it is much better practice to feed steam into the air at each individual apparatus.

When warm water is used for moistening the air and dry saturated air is obtained, it is only necessary to insulate the air lines, and all the producers or generators fed with air from the centrally located apparatus will receive air which contains the proper amount of moisture for the production of the best quality gas. This is an important advantage for it greatly simplifies the control of the operation.

Utilization of Waste Natural Gas

The utilization of natural gas which is going to waste in localities where the gas cannot be transported for use as fuel or returned to the sands to increase oil production is a problem of great importance, the Department of Commerce points out. The United States Bureau of Mines has undertaken studies dealing with the technology and economics of possible processes for converting natural gas into valuable products which can be transported to their respective markets economically.

Liquid or easily liquefiable products such as formaldehyde, ammonia, methanol, and motor fuel can be made from natural gas. The studies will be directed to determine which of these products can be produced most profitably at the locations where natural gas is available.

Gas vs. Electricity for Compressor Operation

A Comparison of Actual Operating ost at the Fresno Works of the Pacific Gas and Electric Company, as Reported by Harry J. Smith to the Pacific Coast Gas Association

PRACTICAL and complete comparisons can be made between gas-engine drive and synchronous electric-motor drive for gas-compressor operation as a result of careful tests made at Fresno. These comparisons cover a wide range in cost of gas fuel and of electricity and apply to various gage pressures of compressor discharge as well as to different percentages of capacity operation of the compressors.

Gas-Driven Unit

A 17-inch by 12-inch duplex gas compressor of the complete automatic suction unloading type and having about 92,000 cubic feet per hour displacement capacity at its rating of 245 r.p.m. is belt driven by a gas engine, 14½ by 24 inch duplex four-cycle, 160 horsepower unit, rated for 210 r.p.m. The test data given below were obtained by Mr. O. L. Dickinson, Division Superintendent of the Pacific Gas and Electric Company at Fresno, during 1928 when this installation was between six and seven years old. The test was made with oil gas such as used regularly for city supply in this locality; it was of typical analysis, of approximately 550 B.t.u. heating value, and of 0.48 specific gravity.

The costs of installation of this equipment, including housing, are as follows:

Building (Wood frame and plaster) 23' x 40' = 940 sq. ft. at $3.00 sq. ft.	$ 2,760.00
17 x 12" Duplex Compressor	4,218.00
Compressor foundation	644.00
160-Horsepower Gas Engine and Air Compressor	$10,133.00
Gas Engine foundation	796.00
Compressor, Suction and Discharge Piping	1,279.00
Gas, Air, and Water piping	1,030.00
Belt, Tightener, and Tightener foundation	1,196.00
Cooling Tower and Pumps	824.00
Total Cost Including Overhead	$22,880.00

The investment included for cooling tower and pumps given in this table was calculated as 2 per cent of the cost of the total cooling installation, since the water requirement for this compressor represented that proportion of the total installed capacity of the plant. The total capacity was for 1,500 gallons per month and cost $41,200. It was assumed for all cost calculations that fixed charges on equipment should include interest at six per cent, depreciation at four per cent straight line, and taxes at two per cent. Thus the total capital charge item which occurs below 12 per cent per year or one per cent per month.

Operating Cost With Gas

In the costs of operation of either gas or electric-driven compressor there are many items which are constant per month, regardless of the capacity at which the equipment is operated. Such items are given in Table 1 for the two types of apparatus now under comparison. This tabulation, of course, excludes the cost of both power for the electric unit and gas for the engine unit.

Table 1.—Monthly Operating Cost for All Capacities

	Electric Drive	Gas-engine Drive
Labor	$ 99.00	$ 99.00
Superintendence 10% of Labor	9.90	9.90
Repairs	18.08	38.13
Lubrication	2.03	17.12
Pumping Water	7.20	7.20
Make-up Water	7.26	7.26
Exciter Power	72.00	None
Lights	1.00	1.00
Fixed Charges	217.00	228.80
Total Exclusive of Power and Gas	$433.47	$408.41

The labor cost was based on three shifts, one man to each shift at $5.50 for eight hours, or a total monthly charge of $495.00. Each man's duties include the operation of five units, namely, an air compressor, liquid purification system, gas compressor, exhauster, and low-pressure booster, so the amount chargeable to the compressor operation is $99.00, or one fifth of the total monthly labor charge of $495.00. The lubrication figure is taken from actual operation. The water-pumping charge is based on 30 gallons per minute under 100-foot head, 15 gallons for the gas engine and 15 gallons for the compressor, making a charge of $7.20 per month based on the average electric rate.

The make-up water is based on two per cent evaporation losses on 30 gallons per minute and 21 cents per 100 cubic feet. Lighting was arbitrarily taken at $1.00 per month on account of the small amount used. The fixed charges per month do not take into consideration a standby unit.

The fuel charge is the only variable to be added to these fixed items. This item varies with the percentage of capacity operation and the pounds pressure at which discharge from the compressor takes place. To determine the monthly gas-fuel cost required only a

Table 2.—Effect of Percentage Capacity Use and Discharge Pressure on Gas Burned and on Output

A.—Gas Fuel Consumed, M Cubic Feet Per Month

Pounds Gauge Pressure	Percent of Compressor Capacity			
	100	75	50	25
0	1,080			
10	1,123	1,112	1,101	1,090
20	1,166	1,144	1,123	1,101
30	1,253	1,209	1,166	1,123
40	1,426	1,339	1,253	1,166

B.—Actual M Cubic Feet Compressed Per Month

Pounds Gauge Pressure	Percent of Compressor Capacity			
	100	75	50	25
10	58,716	44,037	29,358	14,679
20	57,381	43,036	28,691	14,345
30	56,047	42,035	28,023	14,012
40	54,379	40,784	27,189	13,595

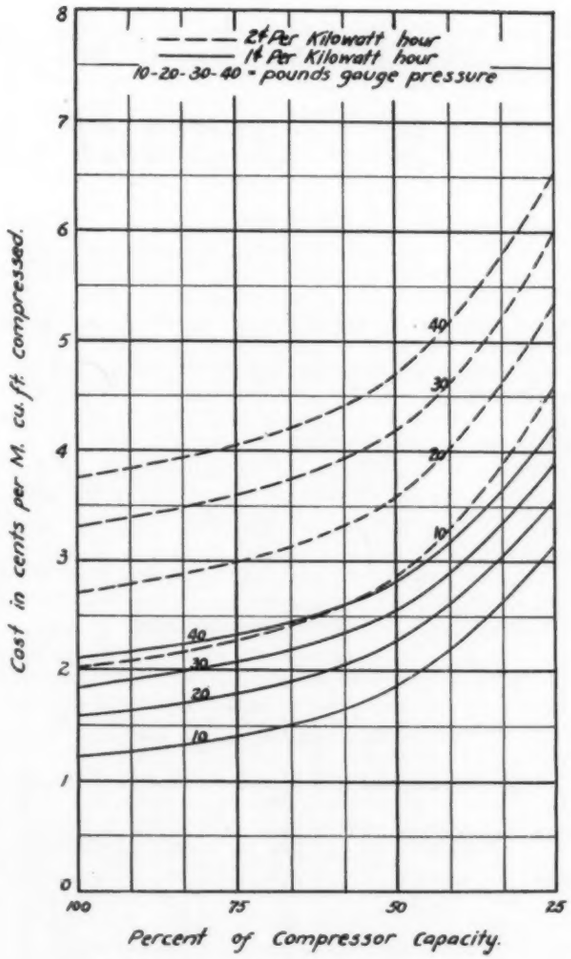
multiplication of the fuel consumption shown by Table 2 by the assumed gas price of 25 cents and 50 cents per M respectively. Adding the result so obtained to the constant operating charges given in Table 1 gives the total operating expense. This total divided by the quantity of gas compressed, of course , affords the figure "cost in cents per M cubic feet compressed," shown graphically in the chart.

Electric-Drive Unit

The electrically driven unit was a 20 by 16 inch duplex gas compressor having an actual hourly displacement of 157,000 cubic feet direct-connected to a 350-horsepower synchronous motor. This compressor was also of the complete automatic suction unloading type and was of the same age as the gas-driven unit. The motor was for 2200-volt, 3-phase, 60 cycle, alternating current. The following tabulation summarizes the cost of this installation, including cooling tower and pump items calculated on exactly the same basis as for the gas-driven unit:

Building (Wood frame and plaster) 22' x 40' = 880 sq. ft. at $3.00 sq. ft.	$ 2,640.00
20 x 16" Duplex Compressor and 350 H.P. Synchronous Motor	11,265.00
Compressor foundation	1,115.00
Compressor, Suction, Discharge and Water Piping	2,523.00
Electric Switchboard, Wiring and 10 K.W. Exciter	3,333.00
Cooling Tower and Pumps	824.00
Total Cost Including Overhead	$21,700.00

The capacity of this compressor was somewhat greater than that of the gas-driven machine, which accounts for the same water-supply charge here despite the fact that no cooling water was used on the motor to correspond with the cooling required for the gas engine. These monthly operating costs which are constant regardless of capacity and pressure at discharge are given in Table 1. It should be noted that for the electric unit a repair charge of one per cent of the capital is deemed sufficient, whereas a two-per cent repair charge is included for the gas-driven unit.



Total cost with electric driven compressor

Table 3.—Effect of Percentage of Capacity Use and Discharge Pressure on Current Used and on Output

A.—Kilowatt Hours Consumed Per Month

Pounds Gauge Pressure	Percent of Compressor Capacity			
	100	75	50	25
0	21,700			
10	77,760	63,745	49,730	35,715
20	110,708	88,456	66,204	43,952
30	135,452	107,014	78,576	50,138
40	152,972	120,154	87,336	54,518

B.—Actual M Cubic Feet Compressed Per Month

Pounds Gauge Pressure	Percent of Compressor Capacity			
	100	75	50	25
10	100,675	75,493	50,328	25,164
20	98,395	73,796	49,197	24,599
30	96,133	72,100	48,067	24,033
40	93,306	69,980	46,653	23,326

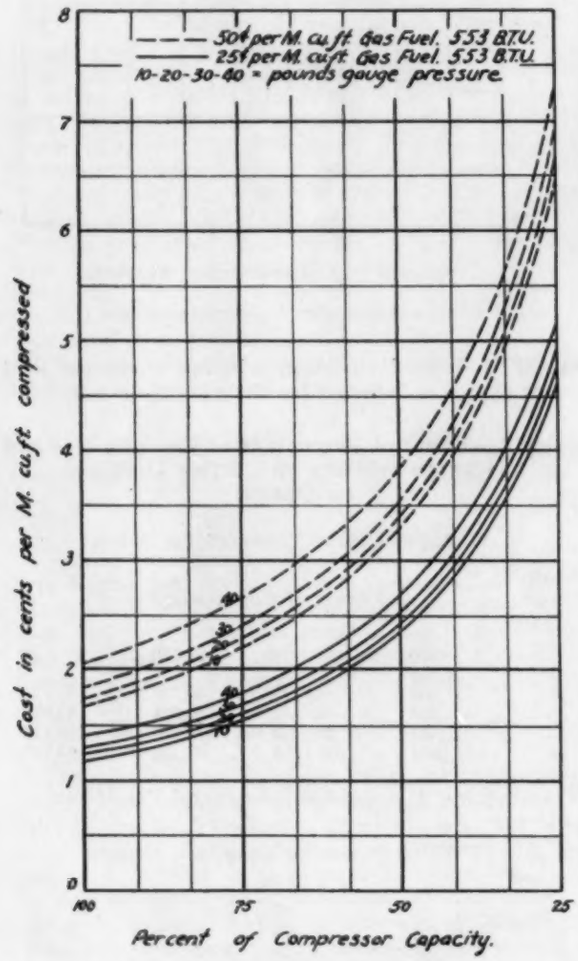
Table 3 shows the relation between power consumption and gas compressed, over the range of compressor capacities and gage pressure maintained. From the data of that table cost of the current for any condition of operation is readily calculated for either of the two typical power rates, one cent and two cents per K.W.H. respectively. The results of such calculation for total cost of operation are shown graphically in the chart.

Conclusion

It will be noted that the cost curve for the gas-engine driven compressor is much steeper than the curve for the synchronous-motor driven compressor. This is due to the fact that a larger number of B.t.u. per break horsepower per hour is required as the capacity of the compressor is reduced. The B.t.u. required for full load is approximately 10,000 per break horsepower per hour and for quarter load capacity 19,000 per break horsepower per hour.

The synchronous-motor driven compressor cost curve is very much flatter, due to the automatic unloading feature which, when unloaded, requires a very small amount of power.

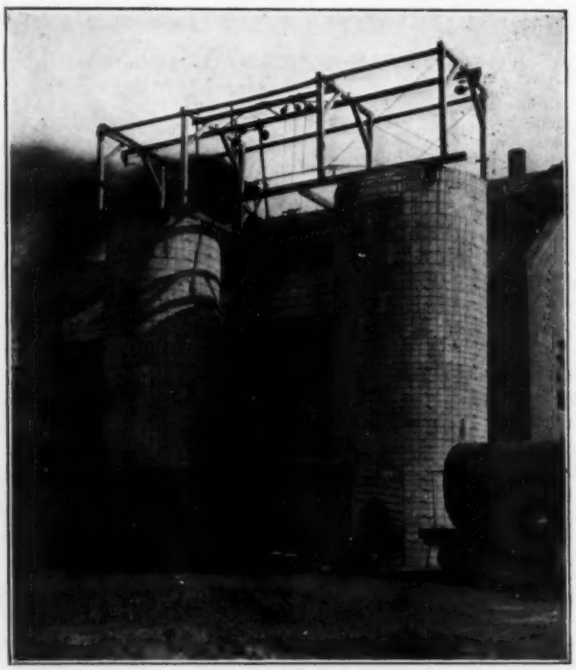
The two cost curves give a general idea as to what may be expected from gas-engine driven compressors versus synchronous-motor driven compressors.



Total cost with gas driven compressor

Modern Coal-Handling Equipment Cuts Costs and Increases Efficiency

THE accompanying photograph shows a recent installation of coal-handling equipment at the plant of the Western United Gas & Electric Co., in Du Quoin, Illinois. It consists of two concrete stave bins of the silo type with a capacity of 200 tons each and is equipped with the monorail system originated and manufactured by the Godfrey Conveyor Company of Elkhart, Ind.



The coal flows from drop-bottom cars through a track hopper into a steel bucket of 30 cu. ft. capacity, and is then raised and carried along the monorail to the desired point of unloading, where it is lowered until it comes in contact with the pile or floor of bin. This contact causes the bucket to divide in the center and discharge its contents with no perceptible breakage of coal. Power is supplied by an electric motor on the hoist which is operated by one man.

One of the bins has a shoveling door into the boiler room on the ground level for steam coal. The other bin has an opening into the second floor from which an industrial car supplies the retorts. Thus by storing the two different kinds of coal in these two bins, the one conveyor system serves both purposes and effects a substantial saving in time, labor and money.

One of the outstanding advantages of this method is the careful manner in which it handles the coal. Instead of raising it to the top of the bins and then letting it fall, the bucket is gently lowered until it reaches the pile. One man can unload and store a carload of coal in from 1½ to 3 hours at an average power and labor cost of from 3 to 7 cents a ton. In addition to the big saving in labor demurrage is eliminated.

The owners of this installation expect to eventually extend the monorail track over an open frame work to provide additional ground storage.

Relation of Barometric Conditions to the Density of Natural Gas

By R. H. Locke

President, Chemical Service Corporation, Oklahoma City.

For complete discussion of the various methods as well as a description of the apparatus for finding the specific gravity of gases the reader is referred to the 1929 edition of the A. G. A. Gas Chemists Hand Book, pages 317-332-Editor.

THERE are several methods in use for the determination of the density or sp. gr. of gases. First and oldest is the "direct weight method." This method is strictly a laboratory method, and due to the small quantity of gases involved in the operation, usually not to exceed 500 cubic centimeters, or a little less than one point, extreme precautions and great accuracy must be taken to insure satisfactory results.

The next method used for this determination is what is known as the "effusion method" using the "gravity bottle." This device is fairly accurate but its accuracy depends entirely upon the precision of the operator. There are many sources of error and this device should be placed only in the hand of operators who are known to have a personal equation of high precision.

On account of the many pitfalls encountered in the practice of operating the "gravity bottle" and the slowness of the direct weight method, a more rapid and accurate method for the determination of the density of natural gas was deemed necessary. Our Bureau of Standards, Department of Commerce, thru Dr. Edwards came to the rescue and devised the Edwards Gas Density Balance.

Effect of Location

In operating the Edwards balance I have experienced a great deal of trouble. This, however, was not due to the balance, or to the method of operation, but to the location of the laboratory at the plant. I have seen the arm in its normal travel downward, before reaching the bottom of its swing, suddenly turn and go to the top or I have seen the same thing happen with the arm on the upward swing—suddenly turn and go to the bottom. Or again, I have seen the arm stop on a quarter position, up or down. This most exasperating conduct of the balance was due entirely to plant harmonics. On some days, and at certain parts of the same day, this disturbing factor was more noticeable than at others. This was due to the taking on or off of different turbines. Different size turbines have different frequencies and as the plant harmonics is resultant of the combined frequencies, one can readily see that high points may appear at any time when two or more machines with different frequencies are in operation at the same time. Due to this disturbing factor, my time per determination was often two, and sometimes three times as long as was necessary. It is, therefore, very important that a balance of this nature be set up in a location where plant harmonics will have no effect upon oscillations of the beam.

There are several modifications of the Edwards balance. Perhaps the best of these is the "Acme balance" manufactured by the Refiners Supply Co., of Tulsa. This is a portable type and has all of the essential features of the Edwards incorporated. The chamber is not water jacketed as in the case of the Edwards but I am of the opinion that this omission is not a serious handicap. With this instrument, it is possible to check the density of gases in the field to good advantage. Another interesting adaptation of the Edwards balance is found in the recording gravinometer which is also manufactured by the Refiners Supply Company. This apparatus is installed on pipe lines usually at city gates or at reducing stations for large consumers and seems to be giving quite satisfactory results but most users find it necessary to check the apparatus from time to time with hand instruments or by sending a sample of the gas to a laboratory for checking, either with the Edwards balance or by direct weight.

In studying several charts made by this instrument it was noted that the greatest variations shown on one chart are from .59 to almost .65, or a variation of almost 6 points in the second place. This affects the multiplier for calculating the delivery of gas thru an orifice meter practically 5% or about 50,000 cubic feet on a million delivered.

In my work over a period of some 700 days with the Edwards Gas Density Balance, I thought I saw a relation between the climatic conditions and the density of the gas under observation. In other words, when I would have a very high barometer reading, the density of the gas under observation would be high, and again, if I had a very low barometer, I would have a low gas density.

Results Vary

Now, do not confuse what I have just said with the application of Boyle's law. Of course, we have just seen that the density of a gas is a direct function of the absolute pressure. It follows, of course that in case I had a high barometer, I would have a high manometer reading on the air, and of course, a correspondingly high manometer reading on the gas, but it does not necessarily follow that the quotient obtained by dividing the manometer reading on air plus its barometer by the manometer reading on Gas plus its barometer is a high figure. But in my work I did observe that this quotient was high at times when I had unusually high barometer and low when I had an unusually low barometer. Frankly, I am unable to correlate this

Abstract of a paper presented before Oklahoma Utilities Assn. Convention, Oklahoma City, March 12-14, 1929.

data with any known physical law and I will not attempt at this time to establish any definite relation between the density of natural gas and the corresponding climatic conditions. It may be that a high density and a high barometer, or a low density and a low barometer were entirely co-incidental, or it may be that these changes are due to some meterological law yet undiscovered, or it may be the apparatus itself is not quite adequate.

In the case of the density of a gas with the gravity bottle, it is quite apparent that the changing barometric conditions materially affect this determination because the rate of effusion is proportional to the density of the gas.

Now, in the case of the Edwards gas density balance, it is true that the direct barometric readings are compensated but no account could possibly be taken of a change in the composition of the atmosphere. If, for example, the atmosphere for some known or unknown cause should be heavily contaminated with co_2, which is a very heavy gas, the barometric readings at the time of making the determinations would, in no wise, be affected, but the "calculated density" of the gas would be materially affected. Again, suppose the air used as a standard should become heavily charged with hydrogen, which would cause a "light air." This, in no wise, would affect the barometric readings at the time of making the determination of the density of the gas, but the "calculated density" of the natural gas would be materially affected.

I use these too extreme and highly improbable conditions to show that there might arise conditions which are not fully compensated for by the Edwards gas density balance, which would give variable "calculated densities."

I am not now ready to assume that the composition of the air is affected by climatic conditions, altho there may later be some new law of aeronautics developed that will throw some light upon the subject.

In conclusion, I will say that in searching the literature on the subject of density of natural gas, I found the task just like searching for an oasis in a desert.

I am not quite certain that this paper, which I have presented here today, has made any material contribution to the present scant literature upon the subject of natural gas densities, and though the results of this effort may be entirely negative it may serve to direct the attention of other chemists and observers to this most important subject, with the result that further investigations, and possibly new methods for the determination of the density of natural gas, may be carried on and perfected to the end that the great industry of distributing this wonderful natural product may be better and more accurately served.

Austrian Results Indicate Yields Increased by Novel Scheme

A large increase in the volume of gas made in carbonizing coal in intermittent vertical retorts is demonstrated by Jay Gülich of Jena, whose investigations are summarized in *Das Gas—und Wasserfach—Männer.* The method consists simply in placing a layer of pearl-size coke on top of the coal after charging and modification of the steaming procedure. *The Gas World* (London) gives a summary translation of Gülich's work in the following language.

We use 12 retorts, 160 in. high. The layer of coke is 28 in. deep, and the coal used is ordinary gas coal in "pearl" size from 0.4 to 0.8 in., free from dust. We used to introduce steam at the tenth hour; now we begin steaming at the seventh hour, and steam intermittently for half hour periods. The steam introduced into each retort per hour amounts to from 12.45 to 13.75 lb. The heats are kept up from 1,140° to 1,180° C. The heating value is watched and the access of steam regulated accordingly, and then the exhaust is adjusted.

The object of the layer of coke is to absorb tar vapours, these being afterwards heated up and contributing to the heating value of the gas. Also the caking of the top layer is prevented; and further, the layer of coke helps by its conductivity in carrying the heat into the interior of the retort. In 2½ hours after charging, the lower one-half to one-third of the coke layer is already glowing; in 3½ hours two-thirds of the coke. The coal, on the other hand, is black under the coke in 2½ hours, red in 3½ hours.

Fig. 1 shows comparative results by the old and the new method. The results of the new method are given in full lines, those of the old method in dotted lines. In the old method there was a small layer of coke at the bottom, and the retort was filled with 9.26 cwt. of coal; in the new method there is still a small layer of coke at the bottom, and the charge is 7.96 cwt. of coal,

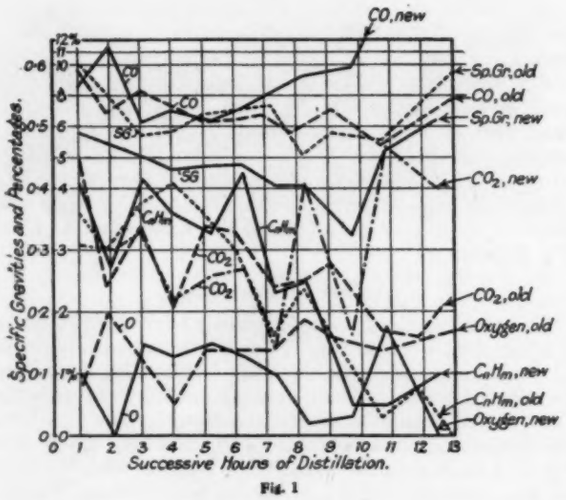


Fig. 1

with a layer of 28 in. of coke at the top. The old method gave 13,773 c. ft. of gas per ton of coal, with a heating value of 525 B.Th.U. per cu. ft.; the new gives 16.775 c. ft. per ton, with a heating value of 517½ B.Th.U. per c. ft.

The C_nH_m lines show that the percentage of higher hydrocarbons is higher in the new method, and that it keeps up remarkably during the later hours of distillation, the full period of which is 14 hours. Taking the areas of the curves, the new method shows an increase of 23.5 per cent. in the higher hydrocarbons from a unit weight of coal. The CO stands on the average at 10.9 per cent. with the new method against 7 with the old; the CO_2 at 3.02 against 2.74; the oxygen at 0.9 against 1.4. The specific gravity is less with the new method.

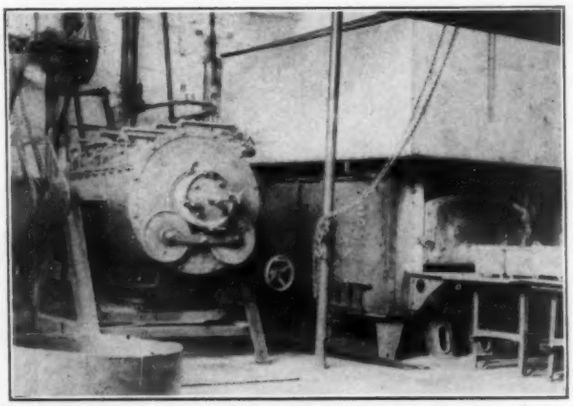
Selling the Industrial Gas Prospect

A Discussion of Specific Suggestions and Ideas Which Will Find an Immediate and Ready Application in Industrial Sales Work

By Ralph L. Manier,

Industrial Heat Engineer, The Syracuse Lighting Company, Inc.

IN order to sell an Industrial Gas Prospect, a Utility should be properly equipped. The contact man should be a sales engineer with pleasing personality. If the Utility is too small to support a sales engineer, one of the better domestic salesmen should be used since the very first contact constitutes a sales problem.



Gas carburizing furnace and gas fired batch type pot case hardening furnace

Before approaching the prospect, the salesman should acquaint himself as far as possible with the heating problems which he expects to encounter in the given factory. Such information can be obtained from A.G.A. Data Sheets and articles appearing in the various trade papers of interest to the Industry.

If there is another factory in the city which is now using gas for such purposes, a friendly service call on this factory will allow the salesman to get valuable information from the workmen and superintendent as to results obtained and advantages of gas over competing fuels. Special notice should be taken of various trade terms used by the workmen as these are of great value in painting a picture for the prospect in his own language.

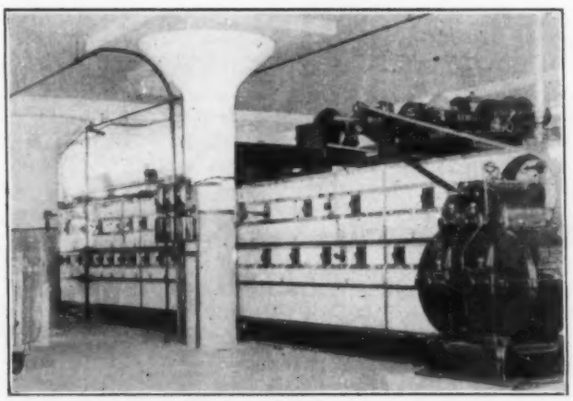
For example, if a core oven prospect is to be sold, the salesman should know what green and burnt cores are. He should know that if a core is baked too rapidly for the given ventilation, a skin baked core will result. The direct results of these imperfections with green or skin baked cores are blow holes in the finished casting. A burnt core causes loss of accurate dimension of the cored hole in the casting as the excess temperature of bake has weakened the core. Either of these defects may cause the rejection of the finished casting. A still greater loss may be the inability to make a promised delivery. A proper gas oven should continually produce good cores with about three times the production per square foot of floor space found with coal or coke heated ovens. The gas consumption, with 537 B.T.u gas, should hold within one cubic foot per pound of core baked. This figure is based on the assumption that the core oven is of the insulated batch type operated at reasonable capacity, and that the weight of core plates does not exceed the weight of cores.

When the salesman has become acquainted with the problems, he is ready to make contact. He should start at the top of the organization, with the general manager if possible.

Valuable Sales Instructions

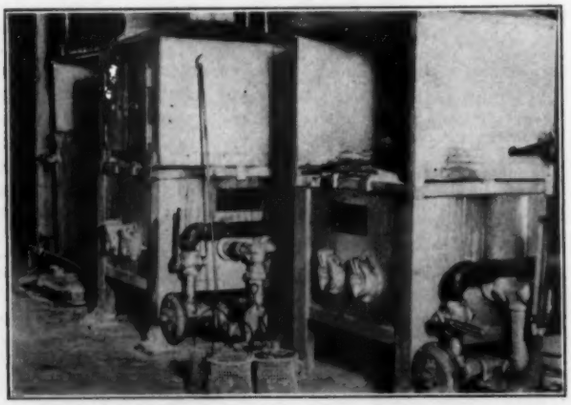
The following instructions will usually help the salesman.

Introduce yourself to the prospect as a representative of your company. Meet him on an equal footing. You are as good as he and you have the backing of your company. Tell him that it would be to his advantage to have a preliminary survey made of his heat requirements. Define the preliminary survey as a careful study of all items entering into a given heating operation so that the true unit cost of production can be shown. Existing data is used and the preliminary survey requires no tests. State that recent developments have improved production costs to such an extent that gas is replacing the cheaper fuels in many cases, with financial gains for the user. Cite one or more of the heating operations you found while preparing for the call. It will tend to increase interest. Request the privilege of an inspection trip through the factory so that you can more intelligently analyze the heating operations.



Horizontal continuous gas heated bread bake oven

When going through the factory, make note of all heat applications. When the inspection has been completed, get a statement of the quantity of material treated in each operation per day and per month, the amount of labor and fuel required with unit cost of each, and the value of spoilage traceable to heat treating operation. Make note of time temperature cycles, unit weights and dimensions of parts treated and any other facts such as working conditions, extreme heat loss, non-uniform heat distribution, etc., which can be improved by the use of proper gas equipment.



Gas fired Cyanide furnaces

When all the available information has been recorded, thank the prospect for his assistance and state that a complete report of your findings will be presented as soon as the analysis is completed.

After the preliminary survey, sufficient data should be at hand to determine whether each heating operation is legitimate gas business or not. Make a permanent office record of all facts noted placing each heating operation by itself. Analyze each heating cycle separately as all may not lend themselves to gas. Should the experience of the salesman or his organization be not sufficient to accurately figure out the gas requirements, call in some competent furnace manufacturer. He will be pleased to help you build up a gas production cost to compare with present method of heating, provided you will recommend his equipment. That is a fair trade.

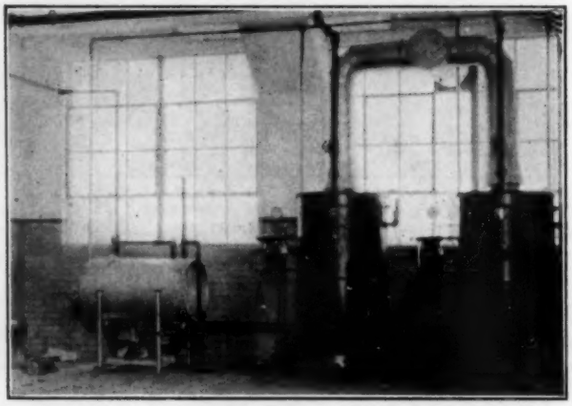
When the gas costs, including interest on money to be invested, amortization, and labor, have been shown per unit of production, their comparison with similar competing figures should give a very definite conclusion as to the arguments for gas.

If costs prove favorable to gas, go and sell. If gas costs do not compare favorably with competing costs, make a study to learn whether the gas rate could be changed to bring the business within an interesting cost with gas and still leave the utility an increase in total net industrial gas revenue. If the study proves to warrant such action, place your proofs before your management with a request for change in rate.

Many plant accounting systems only charge fuel invoice costs against furnace work without consideration of labor to handle fuel, furnace maintenance and rejected material. Often the fuel is only proportioned between different operations without proper basis for quantity charged. In such cases, where competition is close, it is necessary to carry through a Detail Survey.

The Detail Survey consists of accurate determination of weights of material treated, quantities of fuel used, labor requirements and rejections by actual test. A recent survey on a coal fired billet heating furnace showed that gas at 80 cents per thousand would actually, in this particular case, be cheaper than $5.00 soft coal plus labor and maintenance. An added advantage for gas is the assured improvement in quality of product. The result of this particular Detail Survey was the immediate erection of a gas fired billet heating furnace with hearth area of 10 feet wide by 8 feet deep.

In making the survey against solid fuels, weight of fuel fired and cost of labor for coal and ash handling should be considered. In the case of fuel oil, do not depend on oil meters for determination of quantity of oil consumed. At the low rates of flow found in oil furnace work there often is so much slippage through the meter that not over one half to one third of the oil used is recorded. Insist on calibrated tanks or actual weight of fuel used. Where head room is not available to get proper oil pressure by gravity, a closed tank can be used with glass gauge column and air pressure to force the oil to the burners. Such measurement will give accurate oil consumptions. In building up oil costs, charge freight, switching, demurrage, unloading, leakage, burner, and furnace maintenance to invoice cost. This total divided by the total number of pounds of material produced will give the heat treating cost per pound. If the unit of production is considered as the completed article, divide the built up heating cost by the total of such production units made during the test to obtain unit heating cost.



Gas fired boilers with automatic pressure return system

In planning the gas application, have in mind the fact that standby losses count up quickly and that heavy insulation is therefore a good investment. The greater the production per hour, the less the per pound charge due to radiation and flue loss. Therefore plan as great a load per square foot of furnace hearth and per cubic foot of furnace volume as is reasonable. Gas is a flexible fuel and lends itself to uniform heat distribution and thermostatic control. Do not apply gas in the same way oil is used or this factor will not be apparent and the value of those sales arguments will be lost. If the operation is to be performed only a few hours a day, hold down the thermal capacity of the appliance as much as is consistent with good engineering practice so that the heat required to bring the furnace up to temperature will not be a burden on the per pound production charge.

When you have determined the proposed furnace loading and the method of handling the material, you can arrive at production costs by figuring radiation loss at

operating temperatures for given furnace condition. The available B.T.U. per cubic foot of gas at given temperature should be used for this purpose. The heat to material should then be calculated from the weight, specific heat, temperature rise, plus latent heat, if it is a melting problem. The cubic feet of gas to supply such heat is determined by dividing the available B.T.U. per cubic foot at the given temperature. The sum of the gas required to maintain radiation loss and that to heat metal divided by the quantity to be produced will give the cubic feet of gas per unit heated. It is advisable to add 15% to this figure to take care of door openings and to allow a safety factor for production delays.

The better furnace manufacturers will provide the above information if given the necessary production figures and time and temperature cycles. It is always well to use such service and to quote on standard makes of furnaces where possible.

Data is now ready for a recommendation and quotation. It is best to submit the report in typewritten form during a personal call. This provides concrete questions to discuss and there can be no misunderstandings. Such a report will often clinch a sale.

Sometimes a prospect insists on having the facts proven in his own plant. In this event, it is highly advisable to have a written agreement whereby the prospect agrees to purchase the equipment if guarantees are met.

Be conservative in your statement. A buyer is much better pleased to find costs below those anticipated than to find them higher.

If the above methods are followed systematically, they should be of great assistance in selling the industrial gas prospect.

Gas Is a Great Help to the Varnish Maker

VARNISHES are made from mixtures of oils and gums which are heated in kettles up to a certain temperature for a given length of time. The operation is one that depends not only upon the temperature reached but upon the time that it takes to attain that temperature. Certain types of gums and oils require one temperature while others require another. The important point is to attain the desired temperature within a certain fixed time period. It is manifestly impossible to do this on successive batches of varnishes unless the rate of heating is properly controllable.

The fact that a gas flame can be easily and accurately controlled is perhaps the most important advantage that gas has to offer the varnish maker. Such uniformity of heating cannot be obtained by means of a coke fire and those varnish makers, who have changed from coke to gaseous fuel are unanimous in their expression of satisfaction with the more refined fuel. The question of cost is of minor importance for the greater uniformity of the heating with gaseous fuel is productive of economies due to the manufacture of a better grade product and the prevention of spoilage of batches which more than counter-balance the difference in the per unit cost of the fuel.

The importance of attaining the same degree of heat within the same period of time in successive batches rests upon the fact that the properties of the varnish, that is the color and the body, will be principally influenced by these factors. If the varnish is undercooked, then the body is too light, which means that the viscosity is low and the covering power not what it should be. On the other hand if the varnish is overcooked, then the color will be too dark and the body too heavy. The prolonged cooking of the gums and oils affords them a greater opportunity to oxidize and polymerize with the production of substances of greater viscosity and darker color. The color of the varnish is also an important property and dark varnishes are by no means as desirable as light colored ones. It is thus apparent that once a certain set time and temperature are established for any given mixture, it is exceedingly important that all batches of the mixture be cooked for the same length of time and that the maximum temperature be developed within that time. This can be done with accuracy and certainty only when gaseous fuel is employed.

It is very difficult to estimate the gas consumption per gallon of varnish for the reason that the temperature varies according to the quality and proportions of ingredients of the batch. It is estimated that to bring up 125 gallons of varnish to a temperature of 550 degrees F. requires heating for one and one quarter hours.

Battery of three varnish pit fires in which previous coke fires have been replaced by gas

Besides the advantage of greater uniformity of heating, the use of gaseous fuel also avoids the high open flames which are common with coke fires and which are dangerous, for the reason that substances are used in varnish making which easily take fire. Furthermore, with gas, it is very easy to shut off the fire in case of emergency or accident, which is a very important advantage.

Making Glass Container Caps With the Aid of Gas

THE making of caps for glass containers and the machines for applying them is a very important industry and it is interesting to the gas man to know that his fuel plays an important role in the same in the manufacture of caps and the rubber gaskets used with them The use of gas in this manufacturing process is good example of the versatility of the fuel, and the advantages that it affords the manufacturer are

sufficient to counterbalance whatever increased cost the more refined fuel is responsible for. The accompanying illustrations show some of the applications of gas in the plant of the anchor Cap and Closure Corporation in Long Island City, New York.

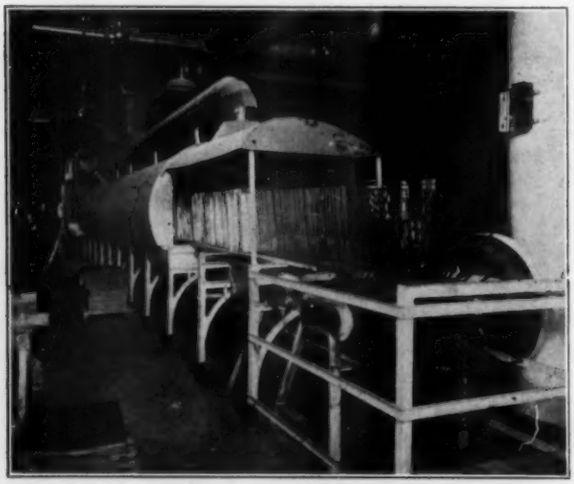


Fig. 1—Delivery end of gas-fired lacquer oven. Heating equipment at top in background

There are three principal as well as a number of minor applications of gas in this plant, the consumption varying between 1,200,000 and 1,500,000 cubic feet a month.

The caps are decorated in various ways, either lithographed or lacquered. In addition, this company makes various kinds of lithographed boxes, for example for holding typewritter ribbons, shoe polish, etc., and also toys. There is an important application of gas in the lacquering department.

Figure 1 shows the delivery end of the lacquering oven and also the air heating equipment which is located at the top of the oven. The heated air is blown down through a pipe and into a duct which is located at the bottom and thus passes through the entire length of the oven. The duct which runs along the bottom of the oven is provided with many perforations, and this makes it possible to heat the oven uniformly throughout its entire length. The fumes are removed by a pipe at the top. The lacquered plates are carried through the oven on an endless chain conveyor, the operation being continuous.

There are many advantages in favor of gaseous fuel for this purpose. One of the most important of these is the fact that the operation can be carried out in a continuous manner. Furthermore, it materially increases the capacity of the apparatus used. The old type of steam heated oven, wherein the operation was carried out in a discontinous manner, was very wasteful in time and high in cost of labor of attendance. While the plates were being treated in the oven, there was generally a period of idleness while the work was being dried. The presence of moisture on the lower part of the treated lacquered sheets was also a disadvantage. The new type of indirectly fired oven enables a thoroughly baked product to be obtained with a much richer finish, which is principally due to the fact that the temperature can be increased to 245 degrees F without any discoloration showing on the work.

Another application of gas is in the drying ovens wherein lithographed products are dried. These ovens are shown in figure 2.

Gas is also used in this plant in the manufacture of the rubber gaskets and other rubber products. The raw rubber is mixed with suitable ingredients, tubed and vulcanized. Thereafter it is cut up into the desired sizes of gaskets. The rubber rolls, which are heated by means of steam serve to mix the various ingredients of the rubber together and form the mixture into sheets. The sheets are then cut into strips about four to six inches wide and fed into the tubing machines. Gas has been found to be much more economical than electricity for this purpose and just as easily controlled. A high efficiency is obtained in the tubing operation due principally to the use of gaseous fuel. Gas is also used to heat the tubing machines which turn out a solid tube of rubber for conversions into rubber stoppers and the like. The vulcanizing apparatus is heated by steam which is usual practice.

This plant also turns out sealing machines and it makes its own dies and parts. The uses of gas in this department, that is for heat treatment, for firing melting furnaces and the like, are of interest.

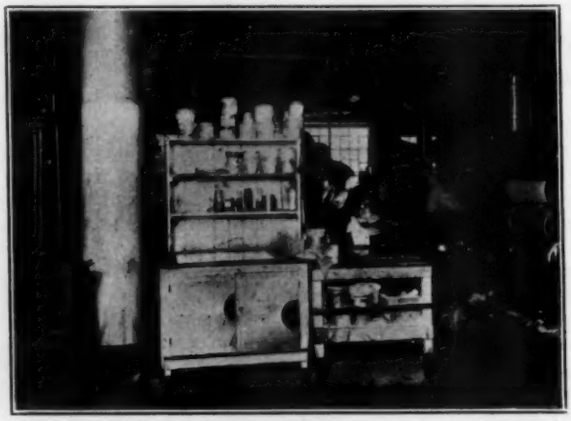


Fig. 2—Working end of three lithographing presses each directly connected to a gas-fired drying oven

West Virginia Maintains Lead in Bituminous Coal Production

West Virginia maintained its rank during 1928 as the leading bituminous coal producing State in the country, the Department of Commerce announces in summarizing a statistical compilation made by the United States Bureau of Mines. Production of Coal in West Virginia in 1928 amounted to 132,600,000 tons as compared with the Pennsylvania bituminous output of 124,720,000 tons. West Virginia exceeded Pennsylvania in bituminous production for the first time in 1927 with an output 9 per cent greater than that of the latter State. Last year West Virginia's production was slightly over 6 per cent more than Pennsylvania's. Although yielding first place in bituminous coal production to West Virginia, Pennsylvania, with a 1928 output of 76,734,000 tons of anthracite, is still far in the lead as a producer of all classes of coal.

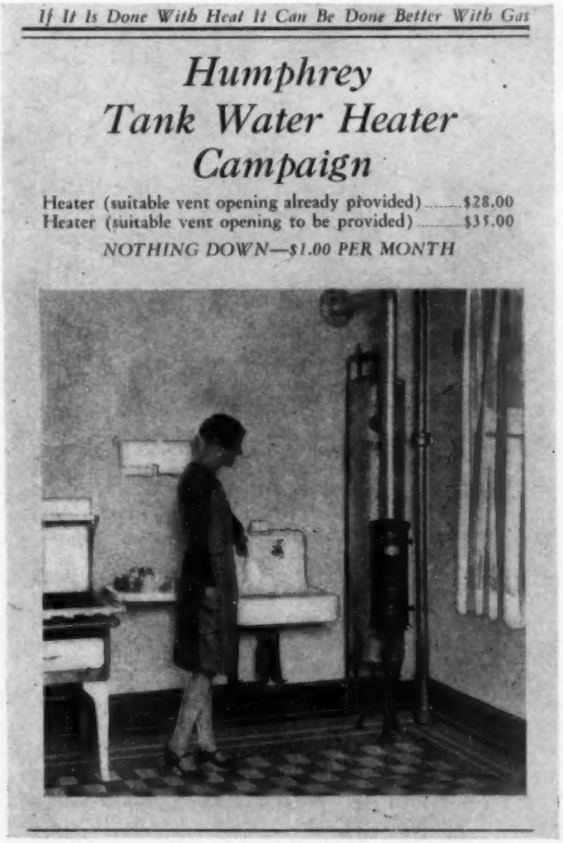
"Every Employee A Salesman"

A Narrative of Successful Gas Water Heater Merchandising in Birmingham

By H. E. Cox

Assistant General Manager, Birmingham, Ala., Electric Company

"EVERY Employee A Salesman" has become the slogan of the Birmingham Electric Company which has achieved unusual results through the sale of merchandise by employees of all departments. This company, which is a combination gas, electric and street railway property, by means of merchandise selling contests between various departments of the company is selling approximately $16,000 worth of appliances monthly outside of the regular business of the sales department.

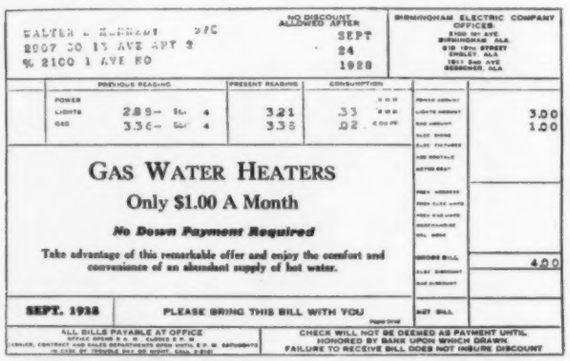

If It Is Done With Heat It Can Be Done Better With Gas
Humphrey
Tank Water Heater
Campaign
Heater (suitable vent opening already provided) $28.00
Heater (suitable vent opening to be provided) $35.00
NOTHING DOWN—$1.00 PER MONTH

Folder distributed to employees explaining operation of heaters and terms of the contest

Meter readers, pipe fitters, truck drivers, stenographers, motormen, conductors and even the colored porters have participated in the selling campaigns which are increasing the company's gas sendout and electric load as well as producing additional profit for the merchandising department.

Inception of Idea

The plan of employee selling had its beginning in the Preferred Stock sales which the company commenced several years ago. The success of employees in the administrative and operating departments in selling preferred stock suggested the idea of promoting the sale of appliances through these same employees, many of whom come in contact with large numbers of people in their daily routine.


NO DISCOUNT ALLOWED AFTER
SEPT 24 1928
BIRMINGHAM ELECTRIC COMPANY OFFICES:
POWER
LIGHTS
GAS
GAS WATER HEATERS
Only $1.00 A Month
No Down Payment Required
Take advantage of this remarkable offer and enjoy the comfort and convenience of an abundant supply of hot water.
SEPT. 1928
PLEASE BRING THIS BILL WITH YOU
ALL BILLS PAYABLE AT OFFICE
CHECK WILL NOT BE DEEMED AS PAYMENT UNTIL HONORED BY BANK UPON WHICH DRAWN
FAILURE TO RECEIVE BILL DOES NOT INSURE DISCOUNT

Typical gas bill showing how same was used during the campaign

Some particular appliance is exploited each month and in addition to the liberal commissions on each sale, bonuses are given to the employees making the best selling records. Sales quotas are established for each department and keen rivalry is manifested between the employees and managers of the different departments.

One of the most successful campaigns that has been conducted was a gas water heater sales contest during the months of August and September, 1928.

Prior to 1928, the annual sales of gas water heaters averaged about 400 per year. In February of 1928 an employees' campaign resulted in the sale of 451 water heaters during the month. Believing that many good prospects for future sales were obtained by employees in this contest, another campaign was put on in August and September.

A Fine Showing

In view of the large number of heaters that had already been sold during the year, it was thought that an additional 400 heaters would be a high figure to aim at during the second contest. The quota of four hundred

Prize Winners

1—R. A. Bennett, Gas Dept., winner of first prize. Total water heater earnings $420.00; 2—T. B. Johnson, Engineering Dept., Total water heater earnings $292.50; 3—W. H. Camp, Gas Dept., Total water heater earnings $282.50; 4—J. A. Stewart, Meter Reading Dept., Total water heater earnings $175.00; 5—Elmer R. Taylor, Meter Reading Dept., Total water heater earnings $160.00; 6—W. A. Walker, Jr., New Business Dept., Total water heater earnings $85.00

was reached during the first few weeks and the final results showed a total of 730 water heaters sold or 183% of the goal. The total sales amounted to $20,440.00.

The winner of the first prize, Mr. R. A. Bennett, of the Gas Installation Department, sold sixty-two water heaters during the two month period. A large number of heaters were sold by meter readers, collectors, engineers, and employees of practically every department. A recapitulation showing the quota and number of sales of each department is interesting and indicates a great number of the quotas surpassed by generous percentages. It further shows that considerable enthusiasm must have been in evidence. Some of the figures, such as from the Gas and Engineering Departments are noteworthy.

Departmental Report of Gas Water Heater Sales

Department	Quota	No. Sold	Pct. of Quota
Sales	100	220	220%
Transportation	35	19	54%
Electric	35	13	37%
Gas	45	185	411%
Auditing	35	84	240%
Treasury	35	60	171%
Power House	15	11	73%
Shops & Roadway	25	9	36%
Executive	5	2	40%
Claim	5	0	00%
New Business	20	36	180%
Engineering	15	45	300%
Ensley	15	35	233%
Bessemer	15	11	73%
TOTAL	400	730	183%

Commissions and prizes amounting to $3,965.00 were awarded to employees at the conclusion of the campaign. A commission of five dollars was paid on the sale of each heater, in addition each sale entitled the employee to one punch from a prize board which had punch holes filled with different amounts of money ranging from 10c to $10.00.

The individuals ranking first, second and third in number of heaters sold during the contest were awarded $25.00, $15.00 and $10.00 respectively. A prize of $10.00 was offered for the individual who led in number of sales during the first half of the campaign, and a like amount for the leading salesman in the second half. A twenty dollar gold piece was awarded to the department head whose department exceeded its quota by the highest percentage. Members of the regular sales force were not eligible to compete for the prizes.

A map was prepared showing the distribution of water heater sales throughout the city and it is interesting to note that heaters were sold in every section of the city. A large proportion of the sales were made by employees in the neighborhood in which they lived. In many cases the wives of employees assisted either directly or indirectly in making the sale. It is believed that the majority of the sales made during the employees contest would not have been obtained through the ordinary course of business. In fact the efforts of the other employees have served to stimulate the regular sales force instead of reducing their sales volume.

Modus Operandi

Practically the same set-up or plan of organization is used in each campaign. Before a sale is launched a meeting is held of all department heads and the article to be offered is thoroughly demonstrated and its selling points emphasized. Quotas or bogies are allocated to each department and the commissions and prizes outlined. At this initial meeting a schedule is also made for meetings in each department at which time the sales manager and the respective department heads explain the sale to the individual employees and encourage them to use their best efforts.

In each campaign literature is provided for individual employees, outlining the prinicpal selling points of the article offered and explaining the commissions, prizes, departmental bogies, etc. Another selling help is a simplified order blank which is on the reverse side of a postal card. In many instances employes have written their names on the postal card and left it with a prospect, with the request that he sign the order and mail the card in. In selling the smaller appliances many sales were made in this manner; but, of course, the larger appliances require more personal effort in closing the order.

Pinch Hitters

The sales department has certain designated individuals who are available to help employees close sales with prospects who are reluctant to sign the order or who wish some of the technical details of the appliance more fully explained.

In addition to the sales of appliances made during the campaigns, it has been found that employees continue to make sales even after the end of the campaign, and for such sales they are allowed the usual commission. To assist the employees, small pocket sized catalogues and order books have been distributed.

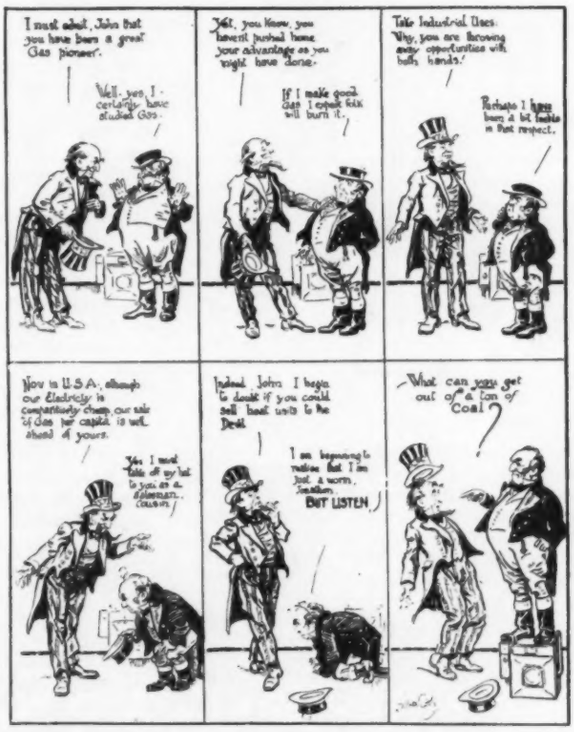
Newspaper advertising has been used during these employee selling campaigns, but the cumulative value of "word of mouth" publicity by two thousand employees talking about the company's products has had a wonderful effect. Another by-product of employee-selling campaigns has been the increased loyalty and esprit de corps which the rivalry between departments has fostered. The commissions and prize money which employees have earned has also had a stimulating effect on employee morale. Approximately one thousand employees, or more than fifty per cent of the company's working force, have made sales of merchandise since this plan was put into operation.

"Cut Prices" Tabooed

"Cut prices" were not employed in the campaigns mentioned and a fair margin of profit was received. Gross sales from four employees-selling campaigns amounted to approximately $67,000. Returned goods and credit losses have been remarkably low, since all orders are approved by the credit department before they are filled.

However, more significant than the profit on the merchandise is the potential send out which has been added to the company's system. Revenue from this source will be accruing to the company long after the campaigns have been forgotten.

THE WORM


I must admit, John that you have been a great Gas pioneer.
Well, yes, I certainly have studied Gas.
Yes, you know, you haven't pushed home your advantage as you might have done.
If I make good Gas I expect folk will burn it.
Take Industrial Uses. Why, you are throwing away opportunities with both hands.
Perhaps I have been a bit feeble in that respect.
Now in U.S.A., although our Electricity is comparatively cheap, our sale of Gas per capital is well ahead of yours.
Yes, I must take off my hat to you as a salesman, cousin.
Indeed, John, I begin to doubt if you could sell heat units to the Devil.
I am beginning to realise that I'm just a worm, Jonathan.
BUT LISTEN.
What can you get out of a Ton of Coal?

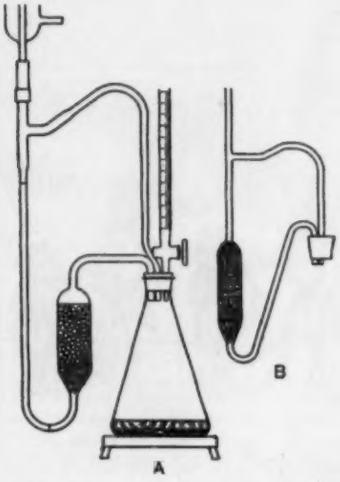
A bit of pertinent gas humor from the Gas World, of London

TECHNICAL AND GENERAL MISCELLANY

CONTINUOUS LABORATORY EXTRACTOR FOR LIQUIDS

The accompanying illustration shows a simple apparatus for analytical extraction of liquids. Two forms are shown, A for solvents lighter than the extracted solution, and B for heavy solvents. Each is made from a pipet of any desired size with the stems bent and connections sealed. In A the bulb of the pipet is filled four fifths full with glass beads before bending the upper stem. The bulb in B can be filled completely afterwards.

The sample, about half the capacity of the bulb, is pipetted into the bulb, before the solvent in A and after it in B. Each solvent is used to fill the rest of the bulb and tubes and have 20 to 30 cubic centimeters in the receiving flask. The solvent is then distilled by means of a hot plate through the upper tube which is bent downward to avoid excessive reflux condensation. After dropping back from the condenser, the solvent bubbles through the sample in the bulb up in A or down in B, and overflows back into the receiver.



If the extract can be titrated directly, as in the case of acetic acid, it is convenient to provide a buret and follow the extraction as it proceeds. This permits extrapolation to infinite time with great accuracy.—*A. W. Francis, Industrial & Engineering Chemistry, Jan. 15, 1929, page 15.*

DRYING AND HEATING A COKE OVEN BATTERY BY LIQUID FUEL

Sufficient coke oven gas was not available for this purpose and so it was decided to use oil in place of coal. The advantages gained with the use of oil fuel counterbalance the greater cost as compared with coal. Selection of a suitable grade of oil fuel was important. It was determined that the following characteristics are valuable in determining the maximum value from a fuel of this nature.

The oil should be capable of being easily atomized. It should be of low viscosity at low temperatures, to ensure ease of flow through the different pipe lines and finally through the narrow tube previous to being atomized. Freedom from water and solid matter is important. The oil should have a high calorific power, its flash point should be low and it should be constant in quality.

A number of tests were carried out with the oil finally selected for this purpose, whose main characteristics are described in the original article, and the main observations made were on the consumption of fuel at minimum flame length and maximum flame length, degree of atomization under these conditions, air pressure required for economic combustion, ease of ignition, adjustment to oil flow, also air volume and general behavior.

Consumption of oil could be varied from a minimum of 0.105 gallon per hour, giving a flame length of roughly six inches, to a maximum of 0.633 gallon per hour per burner, giving a flame length of approximately 24 inches.

Atomization was complete on the minimum flow, while on the maximum flow a small quantity of oil escaped in the form of a fine spray.

Air pressure of two centimeters of mercury (10.7 inches of water) was most suitable for a medium consumption of oil.

Ignition was obtained by turning on the air, then the oil, and by placing a torch lamp with a flame of about four inches behind the burner tube.—*W. H. Russell and F. White, Gas Journal, Jan. 30, 1929, pages 274-6.*

NEW EXPERIMENTS ON THE FORMATION OF COKE

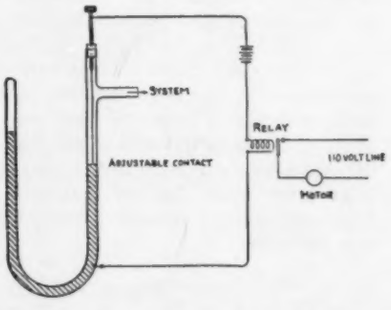
The coal, which contained thirty to forty per cent of volatile matter, was distilled in an electric furnace in a current of nitrogen gas in the form of cubes of 25 millimeter sides. For a speed of heating of five degrees per minute between the temperatures of 300 and 900 degrees C, the degree of swelling, that is the increase in the volume of the coal cubes, is greater, the greater the content of carbon in the coal. In the case of hard coals the swelling is small or even negative. For a speed of five degrees per minute, the degree of swelling is considerably greater in the case of soft coals up to 420 per cent and in numerous cases partial fusion took place. In the case of hard coals the results were analogous to those obtained in the first heating experiment.

It is concluded that the swelling power of coal, that is its tendency to form coke, is a direct function of the carbon content of the coal between 82 and 85 per cent. Then again, the degree of swelling appears to depend as well upon the speed of the evolution of gas, but the ease with which tar is formed tends to prevent the particles of coal from agglomerating. The temperature of swelling or of the formation of coke, say 450 degrees C, corresponds to a rapid evolution of gas and tarry hydrocarbons. If the distillation of the coal is stopped at that temperature, and the coal is cooled down, the tars may be extracted with the aid of hot ether, and the residue is then redistilled up to a temperature of 900 degrees C. A coke is thus obtained which is altogether brittle. On the other hand if the preheated residue is redistilled, without extraction, then a normal coke is obtained.

Hence the sudden evolution of gas at a temperature of approximately 435 degrees C causes a swelling of the coal which tends to form a porous coke. But this coke continues in this form only if the tars, which are produced along with the gas, have the power of binding together the particles of coke, thus giving it its characteristic strength.—*R. A. Mott and T. Shimamura, Fuel, volume 7, pages 472-86.*

SIMPLE PRESSURE REGULATOR FOR VACUUM DISTILLATION

The trouble with devices which have been recommended for the control of pressure in vacuum distillation apparatus is that they have not been accurate.



Furthermore, they are also subjected to corrosion and breaking or sticking. The apparatus which is shown in the accompanying illustration is free from these disadvantages. It contains no valves or moving parts other than an efficient motor-driven pump and a relay, the armature contacts of which are of sufficient size to carry the electric current required to operate the motor. The apparatus is

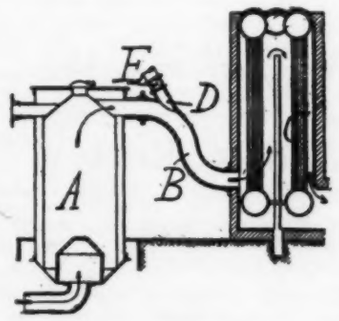
entirely automatic and requires little attention. It maintains any desired pressure constantly within ±0.1 millimeter of mercury.

A closed-arm mercury manometer containing a sealed-in contact and an adjustable contact is connected in series with a relay and a battery as shown. The armature of the relay is connected to the motor which drives the vacuum pump. When the manometer circuit is closed by the mercury rising to the end of the adjustable contact, the relay is actuated and the motor is stopped. When the pressure within the system rises, thus breaking the manometer circuit, the pump is started and continues to operate until the pressure is reduced to the desired magnitude.

Satisfactory regulators are constructed using commercial laboratory pumps driven by one quarter horsepower, 110 volt AC motors. The manometer should have an internal diameter of about eight millimeters in order to minimize the curvature of the mercury meniscus.—*H. L. Cox, Industrial and Engineering Chemistry, Jan. 15, 1929, page 7.*

UTILIZING THE WASTE HEAT IN WATER GAS MANUFACTURE

In the accompanying illustration, A is the generator, from which the blow gases are led through the pipe B to the steam boiler C. A side pipe D is connected with the pipe B, as shown, and serves for the addition of air and auxiliary fuel. The



size of the pipe B is made in such a manner and it is insulated against loss of heat so that complete combustion takes place in it up to the point where it is connected with the steam boiler. C. The flow of gas may be throttled during the blow run by means of the valve E.—*Frankfurter Gasgesellschaft and F. Reichard. Frankfurt-on-Main, Germany. German Patent No. 468,095.*

CORROSION OF PIPING AND DRYING OF GAS

Dust is formed during the internal corrosion of piping which gradually clogs the pipe. The quantities of such dust formed in grams per square meter of pipe surface per year with varying types of gas are given in the following:

Ordinary moist city gas	8.0
Ordinary city gas with a high cyanogen content	75.0
Ordinary city gas freed of its carbon dioxide, oxygen and cyanogen content	20.0
Dried city gas	1.5
Dried city gas freed from its oxygen, carbon dioxide and hydrocyanic acid content	0.0

The figures show that the moisture is the main cause of the corrosion of the pipe, while the other substances become active only in the presence of moisture.

Various methods are discussed for drying the gas, such as compression, cooling and treatment with moisture-removing substances. The economy of the various methods is also discussed. In using the first method, it is pointed out that pressure must be available and that the gas loses about two per cent of its calorific value due to the separation of liquid hydrocarbons. In cooling the gas in order to dry it, it is pointed out that a combination of direct and indirect cooling has given good results. Sulphuric acid, chloride of calcium and glycerin are considered as the practical reagents in the third method. The strength of the sulphuric acid must be greater than 50 degrees Be, otherwise, it will attack iron. Other interesting details of the drying process are described as well as the results that have been obtained in England. —*D. Stavorius, Het Gas, volume 48, pages 70ff and 110ff.*

INFLUENCE OF TEMPERATURE AND PRESSURE ON THE DISTILLATION OF COAL

The principal methods used in determining the constitution of coal were outlined, including fractionation by distillation, fractionation by means of solvents microscopic and macroscopic examination. Mention is made of the work of Pictet who carried out the distillation of coal in a vacuum at a temperature of 250 to 300 degrees C, which permitted him to isolate a certain number of well-defined substances which may be considered as existing in this state in the coal, or as being formed during the course of the distillation. The author studied the endothermic and exothemic reactions that take place and the true and false equilibria. He arrives at the conclusion that in certain cases some exothermic reactions take place contrary to the laws of the displacement of the equilibrium, favored by an increase in the temperature.

The author undertook to use the information of this subject in studying the reactions that take place during the distillation of coal, but his observations led him to the conclusion that the major part of these reactions (cracking and condensation of hydrocarbons) did not ensue within the temperature limits where the relative calculation can be applied to the equilibrium.

The author finally develops the following conclusions.

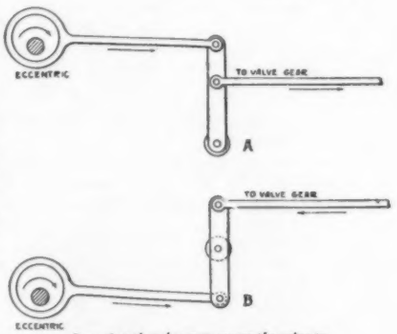
1. The variation in the volume of gas produced, the speed of distillation and the duration of the distillation are all functions of the time and of the temperature.

2. Temperature has an influence on the calorific power and the yield in calories.

3. Pressure also has an influence on the distillation of coal.—*M. A. Bolzinger, Journal des Usines a Gaz, 1929, page 304.*

VALVE GEAR ACTION AND SETTING

The question is often asked how should an engine valve having an inverse rocker arm be set. An inverse rocker arm is a rocker arm in which the fulcrum point pin lies between the ends at which the eccentric and valve rods are attached, as shown at B in the accompanying il-



Inverting of rocker arm causes the valve to move in the opposite direction.

lustration. In this case it will be seen that for a given movement of the eccentric the valve rod of B would move in a direction directly opposite to that of A. in setting the valve, therefore, the regular method should be used and the reversal of movement of the valve rod should be taken into consideration and the directions should be changed accordingly. —*The Power Specialist, January 1929, page 5.*

WORKING LIFE OF RETORT SETTINGS

The following are listed as the factors upon which the working life of a retort setting depends:

1. The material used.
2. The design, foundations and building of the setting.
3. Starting-up process.
4. The working methods and conditions.

In order to have long life, fire clay and silica materials must have certain properties. They must possess refractoriness, and resist any temperature they are likely to meet. They must resist rapid fluctuations of temperature, and must not crumble or crack on being let down. The

crushing strength must be such as to withstand working loads at working temperatures, and the materials must resist any strain likely to arise under working conditions. They must be resistant to the chemical action of dust or atmosphere.

The importance of jointing is also gone into. Bad filled joints will increase leakage of coal gas from the retorts and may produce short circuiting in the flues. Producer gas leakage may be incurred to positions in the setting where it has no right, and local heating may thus be caused. Settlement of the higher portions of the brickwork may take place when joints fail. Jointing material must also possess the proper refractoriness and the proper adhesiveness, so that it will not flux easily nor be pressed out of the joints.

The importance of carrying out heating operations in the proper manner as far as the life of the setting is concerned is also discussed in detail. The proper condition of tie rods is also important. They should be provided with lead rings.

It is also pointed out that steaming the retort has not been found to be deleterious to the life of the setting. Only the bottom one foot of the brickwork was found to be affected and this is easily repaired. Complete data is given on examination of settings which were in operation for a number of years.—*R. L. Greaves, Gas Journal, 1929, pages 225-8.*

AUTOMATIC PIPETTE

In manipulating an ordinary pipette, difficulty is some times experienced in adjusting the level of the liquid, without undue loss of time, accurately to the graduation mark. There is also some risk of drawing the liquid into the mouth. The new form of pipette is so designed that a large number of equal portions of a liquid can be quickly and accurately measured.

The stem of the pipette is cut off at the graduation mark and is fitted, by means of a rubber stopper, into the wide tube D, about three inches long. This tube is constricted as shown at A, and is connected by means of a piece of rubber tubing 1.5 inches long, with a piece of glass tubing C that serves as a mouthpiece.

The pipette is filled by suction until the liquid overflows into D. The rubber tubing is then compressed, when it will be observed that the level of the liquid falls somewhat below the graduation mark. The mouthpiece is then closed and, on now releasing the rubber tubing, the liquid rises again in the pipette and overflows once more. The pipette, held by the mouthpiece, only, is now raised out of the liquid and the contents are delivered into the receiving vessel, any necessary drainage time being allowed as usual. When the trap D becomes full of overflowing liquid, the rubber tubing and the mouthpiece are removed and the liquid is poured out. In this way the mouthpiece and rubber tubing always remain dry.—*Journal of the Society of Chemical Industry, 1928, 368T.*

Recent Government Publications

Documents are available at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.

Care of Machinery.—Reprint of Chapter 35 of the Manual of Engineering Instructions, Bureau of Engineering, Navy Department. 10 cents. Gives instructions for laying up, care while out of commission, and recommissioning machinery installations.

Bureau of Mines Publications—Issued by the U. S. Bureau of Mines. Lists documents published since the founding of the Bureau by subject, by author, and in numerical order.

High-pressure Gas Leakage, by E. L. Rawlins and L. D. Wosk. Bureau of Mines Bulletin 265. 25 cents. Relates primarily to leakage from high-pressure natural gas transmission lines, but is illustrative of engineering work for all types of gas-handling systems.

Fuel Production Statistics—Bureau of Mines printed pamphlets on: Coke and By-Products in 1926, by F. G. Tryon and others, 15 cents; Coal in 1926, by F. G. Tryon and others, 30 cents; and Natural Gasoline in 1927, by G. R. Hopkins, 5 cents. Bureau of Mines mimeographed preliminary figures for 1928 on Petroleum, Petroleum Products, and Natural-gas Gasoline in the United States; and World's Production of Crude Petroleum. Bureau of the Census preliminary figures for the 1927 census of manufacturers on Manufactured Fuel.

Fees for Analyzing Coal—Bureau of Mines Schedule 3B.

Analyses of West Virginia Coals—Bureau of Mines Technical Paper 405. 20 cents.

Coals for House-Heating, by P. Nicholls, S. B. Flagg, and C. E. Augustine—Bureau of Mines Bulletin 276. 15 cents. A report on 500 tests of various coals in house-heating boilers; does not include tests of coke, but is valuable as suggesting comparative data and methods of testing.

Antitrust Legislation—Unnumbered document issued by the Department of Justice. 35 cents. Lists Federal antitrust laws with amendments; also lists cases instituted by the United States and citations of cases decided thereunder or relating thereto.

Corporation Tax Regulations—U. S. Internal Revenue Regulations 75. 10 cents. Gives regulations relating to consolidated returns of affiliated corporations prescribed under section 141 (b) of the Revenue Act of 1928.

Determining Soil Acidity, by E. F. Snyder—U. S. Department of Agriculture Circular No. 56. 5 cents. A discussion of the various factors affecting hydrogen-ion concentration in soils and methods for measurement. Of considerable value to those studying soil corrosion problems.

Commercial Stocks of Coal, January 1, 1929—Mimeographed statement issued by the U. S. Bureau of Mines.

The Flow of Gases Through Beds of Broken Solids, by C. C. Furnas—Bureau of Mines Serial 2904.

Commercial Possibilities in the Use of Synthetic Hydrocarbon Processes in the Gas Industry, by W. W. Odell—Bureau of Mines Serial 2903.

Brown Coal in Germany, by John R. Bradley. Bureau of Foreign and Domestic Commerce Minerals Division Special Circular 685. A discussion of production, characteristics, marketing, and industrial uses, including briqueting and carbonization methods used in Germany.

High-Pressure Gas Compression System, by J. R. Dilley and W. L. Edwards. U. S. Department of Agriculture Circular 61. 10 cents. Equipment for experimental work with very high gas pressures, up to 1500 atmospheres.

Book Review

Gas Chemists' Handbook. American Gas Association, New York. 800 pages. Price $7.00.

This authoritative volume appears in a third edition sponsored by the chemical committee of American Gas Association. The work has been carefully revised, as one would expect from such a competent committee as has devoted its time unstintingly to the work. The volume will be correspondingly welcome.

No gas company can afford to have its testing work done on any other basis than in accordance with the latest and most widely accepted methods. Hence every works laboratory should not only own, it should actually and daily use, this revised edition of a book which represents the standard practice of the industry. The industry is to be congratulated on having so worth while a book prepared for its service.

What About This New Competition?

By William H. Matlack

PRESENT day competition in the merchandising of any staple or specialty is more omnifarious than at any other period within the knowledge of man and it has far more ramifications.

Advertising based upon research has brought to light a multitude of startling facts in connection wth human behavior. These facts have been taken advantage of and put to work by wise merchandise men to aid them in turning the buyer's elusive dollar from the purchase of mutton chops to the buying of malted milk, thus changing a habit, or buying trend.

These changes in buying trends have been brought about by artful advertising, efficient sales methods, a promissory payment system and speed, all of which may be directly traced back to the invention of the printing press which has guided the hand of progress through the enlightenment of the masses. Production since the world war has far surpassed economical and efficient distribution, notwithstanding the advances made in high speed trans-continental transportation and the shortening of distances between the urban and the inter-urban dweller and market.

Meat Eating

To illustrate, some may charge the decrease in sales and consumption of meat, to the increased cost of meat to the consumer, due to the high cost of stock feeding, while others will point out that it is due to the increased use of fresh fruit and vegetable salads. Still another group will attribute the decrease in the amount of meat used to the fad for slimness, while a fourth group may lay the blame on the nomadic existence of the average American and directly chargeable to the increase in motor travel and general restlessness. Yet the corner restaurant has spread all over every city block and run-over into countryside cafes, while Americans are eating less meat than they did ten years ago.

The cause of any trend, whether it be one decreasing the amount and kind of food we eat, whether it be one that sends our linens to the steam laundry or induces us to eat out of a can, or whether it changes a house from a home to a place to go to change our clothes to go some place else, may be readily run to earth, its origin learned and charged to this or that change in our habits. But as merchandisers this should not concern us greatly, unless we are willing to utilize the knowledge to strengthen our methods of selling.

William H. Matlack

When we know the cause or know there is a cause and feel the effect of any trend that retards our business progress or the progress of the industry there are but two methods of procedure for us to follow; we may either sit complacently on the side lines, as we did at the advent of electricity for lighting and witness our business slip into oblivion, or we may look the new trend and competition squarely in the face and fight invention with invention, rate with rate, B.t.u. with added B.t.u. and more of them in more places, and win our place in the sun and our right to say we are merchants.

There are literally millions who know nothing of the romance of gas, of its manifold uses in freeing the man in industry and the woman in the home from thousands of laborious tasks. These we need to enlighten with more and better ADVERTISING.

The domestic or home market is the big customer of the man who has any commodity or service to sell. It is the market that draws at least seventy per cent of the gas from the industry's distribution lines, and in some communities this home market consumes as much as ninety per cent of the total amount of gas sold and purchases a like ratio of the merchandise sold by the gas man.

This new competition which concerns retailers and manufacturers whose largest market is the home market, can only be successfully fought with research and analysis, research to determine the ailment and analysis to learn what treatment to prescribe. Analysis of any item of merchandise or method of marketing will quickly and convincingly expose the weak spot in connection with the merchandise or the methods of marketing and with this done our engineering background should enable us to determine the next step to be taken.

Where a gas company finds that the number of non-profitable customers are increasing or where the gas sales per domestic customer is scaling down an analysis may show that the past fifteen years have been devoted almost entirely to exploiting the gas range and circulating water heater, with an occasional spasmodic flare on seasonable items. The sale of the modern oven heat control, carefree gas range and the continuous flow type of gas water heater are most desirable and should be continuously pushed, for they are very desirable load builders and essential to the modern home, but they are not the "promised land" by a wide margin.

With this new widespread competition we find among other things that the use of meat, potatoes, whitebread and pastry as items on the daily menu has shown an appreciable decrease during the past ten years; on the other hand, we find that whole and malted milks, ice cream, whole wheat bread, fresh and canned fruits and vegetables, poultry and eggs as items of daily diet have increased. We may attribute this to many things; more and shorter styles, more money expended for gasoline and motor oil and spare tires, the talkies, sports, the fad for slimness or the prevalence of health talks in newspapers and magazines and over the radio. We might go a step farther and attribute it to our natural desire for fresh fruits and vegetables the year round and their easy availability due to improved refrigeration and rapid transportation.

Effect of Diet Change

The value of proper foods as an aid to better health has been favorably implanted in the American mind and while seemingly, with the decrease in the consumption of the old stand-bys, white bread, meat and potatoes and pastry, the decrease in the consumption in many homes may be charged to the change in daily diet. Yet, we find on the other hand that there is an increase in the use of fruit, poultry, eggs and whole wheat bread, which if cooked in the home should offset the loss sustained by the first items named, but it does not work that way.

The apparent gain is offset by quantity cooking and quick lunches.

However diligently the gas industry may try to recapture this so-called kitchen market, it is felt that the effort will be

of but small avail and not nearly so effective as one that mobilizes all of our forces to not only re-capture and keep the kitchen market, through the aid of modern educational methods, pertaining to carefree cookery and hotel hot water service for the home, but also develops a concentrated high-power program to teach the home manager of the vast increase in health and happiness that may be brought into the home through the use of such appliances as a gas refrigerator, an incinerator, a laundry dryer, and the germ destroying rays produced by the use of a radiant gas fire.

In marshaling our forces,—advertising, store and window display, store arrangement, better lighting and ventilation, demonstration and personal salesmanship,—to capture this yawning market it behooves us to give it the best there is in us. If we are smart we will approach our market in full confidence that the appliances and service we have to offer are a boon to any and all buyers. We must not go at it apologetically, half heartedly; we must get right with ourselves and if we can't do that we should move aside for someone else who can partake of the results to be had from the sale of gas and gas appliances to the great American Home Market.

The Salesman Talks

It might be enlightening to view these dwindling sales per meter through the eyes of a salesman who may have become soured for some reason or other.

Sitting comfortably in one of those big roomy chairs in the lobby of a hotel, away from the ordeal of originating an order, this man said;

"You know I have come to the conclusion, after many wakeful, restless nights, that this business of buying, pricing and selling, that we call utility company merchandising has reached the point where it may be likened unto the tail that wags the dog.

"Speed, change in living conditions, spell-binders, quota-makers, price-cutters and premium-producers together with remote control have put so many cogs in the old gearing of the selling machine that it has almost ceased to be attractive. In fact if you made some of my calls with me I believe you would agree with a friend of mine who said; 'these fellows are running a super-policy game, rather than a merchandising business.'"

Continuing this man said; "A goodly number of these remote-control sales managers are conducting but one thing, a quota contest. How to attain a quota is the big question, and the only one. It seems that the problem has degenerated from one of how to select merchandise that folks want, price it so that it will produce a profit and serve someone and thus build a healthy business and a lot of good will for the seller, to one of how to show a large volume of sales regardless of anything else.

"The way the thing operates is something like this; the master-mind reviews sales for two or three preceeding years and concludes that they 'have been rotten, selling nothing like we should, and it's all because we have not had a quota to shoot at.' He then proceeds to establish a quota based not on a knowledge of the cities, towns, villages and hamlets covered by the companies distribution systems, of the existing economic conditions, but upon the number of meters in the territory. 'That simplifies the matter. Here with all these thousands of meters we should sell merchandise to the value of $11.73 per meter and that's what we'll shoot at this year,' he says

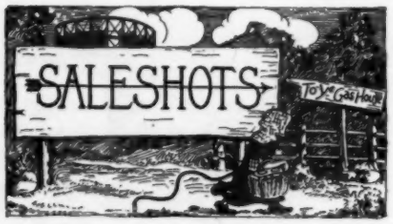
"The next step then is to decide what he is to sell to make the quota, and this is arrived at by calling in a group of manufacturer's representatives and after a glut of entertainment and a dearth of thinking the merchandise that will be campaigned is decided upon. The choice is very often being decided upon after due consideration of the premiums that may be offered the customer or what kind of a cut-price offer may be made.

"This stand is arbitrarily taken with no consideration to what the customers' wants may be and is as I view it one of the policies that is responsible for the falling off in gas sales per meter."

What this man says does happen, but happily, it is the exception and not the rule and our purpose in quoting him is to forewarn those who may be contemplating the quota method as a means of increasing sales. The quota idea is a commendable one if it is carefully worked out first with regard to individual situations and then broken down to operate collectively and this may be done through a careful analysis of each territory in which it is proposed to operate. However, after the analysis has been made it may be well to throw in the age-old principle of good engineering practice and add a factor of safety, giving the organization an attainable rather than an unattainable quota.

It is human nature to wish to win, and it is a part of good salesmanship to go over any reasonable objective, while on the other hand it is easy to alibi if the hazard seems too great. It is better management to set a goal that you are reasonably sure your salesmen can make than to set one that it is just possible for them to make. In the first instance they will probably throw in their own native wit and resourcefulness with such a plan and exceed the number or amount set while in the latter they, in the majority of cases, will go out to do it with the feeling that it can't be done.

The best insurance for banner sales from any organization is the knowledge that the organization is fully sold on the merchandise it is expected to sell and the plan on which it is supposed to sell it. It's the old truth that confidence will win-out every time in a pinch, and that no man can become more than mediocre in undertaking to do the things he does not want to do or in selling the thing he has no faith in.



Read the Book

Upon several occasions, during the life of this column we have spoken of the wisdom of "reading the book". This admonition is one well administered by an admirable teacher of salesmanship, who always wound up his dissertation with, "Now fellows, I've given you all I've got for you today, so go home and read the book."

"The Book being our manual on washing and washing machines, I want you fellows to learn all there is to learn in it and after you've learned it's contents and you still click and show enthusiasm, we'll know you can go out and make better Christians; sell washers."

Roper of Rockford must be another disciple of this old teacher's teacher, judging from a Sales Data book that P. W. Hopkins has sent us,—a diminutive book but a doggoned good manual for the man who wishes to sell gas ranges and can appreciate the wisdom of the old Oriental saying, "He who knows not and knows not he knows not—he is a fool. Shun him. He who knows not and knows he knows not—he is simple. Teach him. He who knows and knows not he knows—he is asleep. Wake him. He knows and knows he knows—he is wise. Follow him."

Emancipation

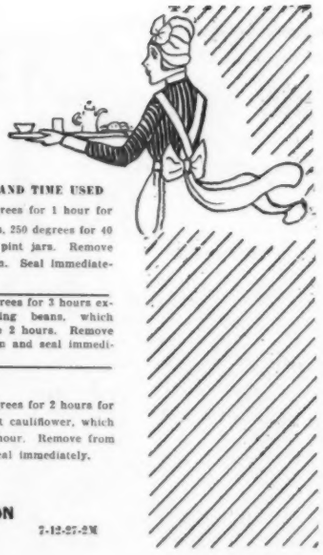
"Freedom has a thousand charms to show
That slaves, howe'er contented, never know,"

said William Cowper, thereby offering the forward-looking gas man an idea on which to base his sales appeal to the home manager.

Offer her freedom from cooking worries through the use of the modern gas range with ventilated oven, safetop, auto-slide broiler, color, oven control and what-have-you. Show her how these modern fixin's will enable her to have more time for her friends, her family and the big out-of-doors this Spring and you'll sell her a modern gas range. And when you trade in her old one see to it that it is smashed to smithereens, thus assuring yourself that another antiquated appliance is off your lines.

Give 'Em a Souvenir

"When you ask folks to attend a demonstration" said one of the best known demonstrators, "always have some little thing for those attending to carry home



HOME CANNED VEGETABLES

METHOD	HOW TO FILL JARS	TEMP. AND TIME USED
Tomatoes—Scald long enough to loosen skins. Dip quickly in cold water, core and skin. Pack whole or cut if too large to go in neck of jar.	Do not add any water. Add 1 teaspoon of salt for a quart jar, or one-half to pint jar. Place scalded rubber in position. Adjust lid loosely.	250 degrees for 1 hour for quart jars, 250 degrees for 40 min. for pint jars. Remove from oven. Seal immediately.
Peas, String Beans, Lima Beans—String and grade. Place in cheese cloth bag and scald from 5 to 10 min. in boiling water. Dip in cold water. Pack whole.	Fill jar with boiling water. Add one teaspoon salt to quart jar, or one-half to pint jar. Place scalded rubber in position. Adjust lid loosely.	250 degrees for 3 hours except string beans, which should be 2 hours. Remove from oven and seal immediately.
Greens—Scald (in steam) 15 minutes. **Asparagus**—Scald 10 to 55 minutes. **Brussels-sprouts**—Scald 5 to 10 minutes. After scalding any of the above, dip in cold water. Cut in convenient sizes. Pack tight, season to taste.	Fill jar with boiling water. Add 1 teaspoon of salt for quart jar, or one-half for pint jar. Place scalded rubber in position and adjust lid loosely.	250 degrees for 2 hours for all except cauliflower, which takes 1 hour. Remove from oven. Seal immediately.

HOME SERVICE DEPARTMENT
ILLINOIS POWER & LIGHT CORPORATION
For Better Public Service
WM-10 7-12-27-2M

with them to remind them of the demonstration. I invariably make it a point to see that they have one or two recipes that I demonstrate and sometimes, if time permits, I include all of them. Moreover, whenever I can I like to hand them a cook book containing tested recipes. We often use booklets of this kind produced by the manufacturer of the range used in our demonstration.

Store Sales

"How can we get store sales?" asked the sales manager of one of the big utility chains the other day. "The blasted chain stores do, the five and ten cent stores do, and now the general department stores that are invading our towns seem to be doing it, but we do not seem to be able too; why is it?" he asked.

The reply we made or what we think does not matter, yet our experience in other lines of merchandising of the scientific variety, and that is the type the chain store practices points to the fact that the chain plan is no more than the obvious one. There is no mystery, or tricks to their plan; it employs nothing more than a scientific knowledge of how to display the merchandise they have to sell. If you will but stop for five seconds and think you will agree that their whole sales plan is built upon studied display, both in their windows and stores.

The chain store manager has made selling automatic, so to speak. Surveys and investigation taught him long ago that folks are eye-minded. They have the habit of looking for what they want, and the majority of them, even wanting an item of merchandise, do not ask for it, but shop until they see it. They are eye-minded, and the chain store displays its merchandise in an attractive inviting manner. The customer sees what he wants along with a lot of other things that he did not realize that he wanted until he saw them. That seems to be the thing that sells merchandise; exposing it to sales, attractively.

Let's stroll into the chain store and see what we see; there at the very front door are a lot of Mazda lamps, priced at the same price as those in the window of the electric company. But these are displayed whereas the girl of the electric company's store digs them out from under the counter. Note how nicely they are arranged all in sight, at eye level, and here at this counter are gas waffle irons all neatly arranged with handles at attention. You do not have to stand askew to examine the mold once they have opened the iron, and a neat card in a stand frame tells you that they are priced within three cents of the price at the gas company's store. You may examine these as you will—they're exposed.

These stores may furnish the gas man who is confronted with the problem of store sales some very excellent ideas. It is well to study their displays and it might be well to study their methods of sale, especially in the department store field if you have one or more of these stores in your city, for they are selling gas ranges, hot plates and water heaters and they are making these sales in their stores.

Don't Neglect Window Trim

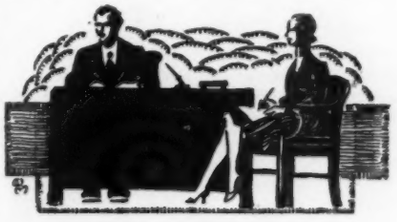
Window display advertising is slowly but surely coming into its own and gas men all over the country are taking an interest in this movement. Aside from that, one or two manufacturers have intimated that they are sold on the power of window display persuasion and are offering prizes for the best window displays containing their merchandise. This must be mighty encouraging to some of the boys who have in the recent past had to pad their expense accounts to get a little crepe paper and a few water colors for display work. The electrical industry has been encouraging the window display man for a number of years and makes us mighty happy to find, here and there, a gas man who will pay for an idea.

Good Advice

"Take this," said the General Manager of one of the big holding companies to his steno.

"To All Commercial Managers:—For the past six months I have been studying the advertisements published in the daily newspapers in our territory and I have come to the conclusion that we are not giving the advertisements the proper amount of time and thought.

"You spend an hour or two each day in lecturing your men about personal approach, appearance and the dignity which they must possess to properly represent our company and then turn right around and send out an advertisement through the columns of the daily newspaper that is slovenly in appearance and that approaches the customer in a manner that you would not tolerate in your men. These advertisements frequently cost as much or more as the drawing account we pay a salesman and yet they are tossed out to the public without a thought of cost in mind, let alone effect.



The purpose of our advertising is to do two things, promote an interest in the service and merchandise we have to offer the customer and build up favorable public opinion,—confidence in our organization,—and it behooves you men who are responsible for these advertisements to see that they do that. What do you say to it?"

Putting an Idea on Foot

Being confronted with the problem of introducing a new model gas range to our customers during the early spring months when folks are 'raring' to get out into the open we cast about for a sales appeal that seemed to have enough of the unusual in it to interest users and non-users alike in the matter of more efficient modern cooking appliances. We realized that any effort that would move a large volume of ranges quickly had to be based not alone upon the matter of carefree cookery or price of the appliance but that a new element must be introduced.

We talked the matter over among ourselves and with the manufacturer's repre-

sentative, yet we did not seem to hit upon a happy idea until one day while thumbing through the advertising pages of a National weekly publication which seemed to be crammed full of automobile advertisements. We began to study these advertisements with the idea that possibly some of them might contain an idea that we could apply to the range sale under consideration. And strange as it may seem, at about the time that we had decided that automobile advertisements held no ideas that we might use we discovered the key to our problem. It was the everlasting use of the word "NEW," and that was the thing we were looking for, and around which we decided our sale would be built.

Aside from this we decided to do the obvious; run four teaser advertisements, put a special low down payment on the ranges we wished to feature, and give the usual allowance for an old stove.

The teaser advertisements were run for four days; Tuesday, Wednesday, Thursday and Friday, one on each page of the local newspaper, and were followed on Sunday by an advertisement headed "The Sale is Hatched" and on Tuesday by an advertisement headed "When Time Was Less Important." These two advertisements contained enough facts about our merchandise and the plan of sale to the end that we followed through the balance of our sale with advertisements of the announcement type, to be assured of continuity, and to constantly keep the fact that we were having a sale before the people.

During the sale we displayed the models on which we were making our drive very prominently on the sales floor and in our windows. The window display was built to tie into the first advertisement announcing our sale.

Deciding on the theme to employ in our advertising was our big job and once that was accomplished we did the obvious thereafter. We gave a special talk to the salesmen regarding the range, the plan of sale and a reasonable quota we expected to make, and the matter of following up all prospects on file and any created by reason of our advertising. The result was that, despite the inclement weather which prevailed the greater part of the month, our sales record at the close of the thirty days showed that one hundred and ten ranges including one combination range had been sold and that while our advertising did not especially stress oven heat regulation over fifty per cent of the ranges sold were equipped with oven heat regulators.

This Is Good

A number of worth while plan books are being offered by appliance manufacturers this year and if properly chiseled down to your particular territory and followed through they will materially increase appliance sales.

In speaking of these plans one promotion man of wide experience said to this writer; "We have gone to considerable expense for a number of years to work out sales plans for dealers and we have been rewarded by many successful sales from these plans, yet from the number of plans we have sent to dealers these successes have been infinately small. In checking over our efforts to promote sales for last year we took the number of plans sent out and in turn listed against each dealer's name, to whom we sent these plans, just what action was taken, what effort was put forth to follow out our plan and what the results were from each sale. To be frank with you the results were not as gratifying as you might think, so we have decided to go at it in an entirely different manner this year and keep a closer check on what the dealer does to follow out our suggestions and what results accrue from such effort.

"We expect our salesmen to present these plans to the dealers and go into them in detail and get an O.K. on them or such parts of them as they will use. The salesman will then send his order in for the material and our advertising department will get it out and notify the salesman on the day shipment is made to the dealer in order that he may be on hand at the dealer's store a day or two after the material is received. It will then be his job to see that newspaper advertisements are properly scheduled, that the dealer gets proper prices, terms and premiums listed and that the space that we always leave for "your name and addresses here" is filled in properly and that preparations are made to distribute the direct mail matter and that window displays are set up or scheduled for set up the day before the sale opens.

"We feel that this is vitally important and that we who are just as much interested in the success of the sale as anyone else have fallen down at this point, tor time and again our representatives have reported that inserts were not used, that newspaper copy was not run, that store displays were not made and that window display material never get out of the ware-room,—these sales naturally were flops. We have actually found cases where the cost of the helps we furnished the dealer were greater than the profit we received from the appliance sold and we cannot afford that. The plans and ideas that we are offering the dealer this year cost us real money and we and our agents have given them many hours of thought and with past experiences to guide us we are going to stick a little closer to the job this year than we have here-to-fore, with the idea that we all will do a better job in getting the merchandise into the home of the user."

Sad Moments in Selling

"If you have floor salespeople," said the manager of the household department of a big department store, "see to it that they meet and greet all persons entering

your store. While they are on the floor see to it that they are on their feet. This may be accomplished by working out rest periods, when the regular salesperson may be relieved by one of the clerks in the sales department. There is no one thing that provokes a prospective purchaser more than to enter a store and fail to secure immediate attention, and he is especially peeved if he sees some sales

person at ease who pays no attention to him."

Joy Stuff

Look over this eye attracting advertisement that a lot of gas men and dealers in gas appliances will use. It's modernistic in appeal and nicely laid out and everything and, best of all, it contains a reason why the continuous flow type gas water heater is an essential in the American home. There is only one thing that the gas man has to look out for and that is to be sure to get his signature into the ad.

JOY
READY
To Step!
When Mabel, the family pride, greets her boy friend, you may be sure she's not planning a wild evening at dominoes.
She's ready to STEP and when we say "ready," we mean READY! Spic and span from top to toe, clothes freshly laundered, and only fifteen minutes out of the bathtub, she makes a pleasant picture of youthful JOY.
For Mabel and the whole family, buy RUUD Perfect Hot Water Service. Sold now on monthly payments—a small price to pay for real and lasting JOY.
SIGNATURE

Sell 'Em Waffles

Don't sell waffle irons, but sell better baked, delicious, brown waffles. Use colorful glass waffle sets to attract folks into your store to purchase a complete waffle service; a waffle iron and a colorful set of dishes for serving them—and do not forget to have your sales people primed to the point where once folks enter the store they will lead them up to the other appliances that will conserve their time and add to their home comforts.

A Telling Bulletin Board

Here is a day and night bulletin board that was used by the Illinois Power and Light Corporation to promote house heating in East St. Louis. It will be noted that it is a tie-in to the National advertising which was carried on by the manufacturer of a well known house heating boiler. The words "GAS the carefree fuel" that plays so prominent a part in all of that company's house heating advertisements should be noted.

More of Such Needed

Here is an advertisement used in a program that we'll bet was read.

Look at it and you'll read "The Birth of Leisure." Who would not be interested to the extent that he would read this ad to see what it was all about? And reading, he or she would become wise to the fact that "gas as a servant in the house" has made leisure possible to countless home managers. It's an advertisement that answers that question "what will it do for me?"

If we can get a whole raft of such advertisements circulating we'll certainly strengthen the sale of such home appliances as go to build up the sale of gas per domestic meter.

The Birth of LEISURE
THE advent of gas as a "servant in the house" was the real birth of leisure for the American homemaker.
In the early 90's, when the gas range was being introduced, New York possessed only 20 first-class legitimate theatres, each open for about 30 weeks of the year. Today we have more than 60, besides hundreds of motion picture houses, that aim to keep their doors open at least 42 weeks a year.
It was the gas stove, as the true forerunner of a vast multiplicity of time and labor-saving devices, that made it possible for the wives and daughters of every class to enjoy the benefits of instruction, entertainment and opportunity that the theatre of today provides.
"TO SERVE NEW YORK"
CONSOLIDATED GAS COMPANY OF NEW YORK
GEO. B. CORTELYOU, President
MORE THAN 105 YEARS OF Uninterrupted PUBLIC SERVICE

Sell 'Em Style

"What will we tell her to sell her?", asked a saleswoman the other day when a new model range was exhibited on the sales-floor of a midland gas company.

"How do you think we should try to interest the home manager in this range; the price, you know, is slightly higher than our regular line."

"Sell her style," said the salesmanager, "style, style, style, and nothing else; just put across the idea that this range is a range that is *the style* and forget the price. We know it's a good range and we need not worry about that".

As we view it this salesmanager is perfectly correct. Price does not enter into the average sale, if the merchandise is in style, and gas men have lots of style in today's gas appliances. Seek it out, and sell 'em style.

Sell Them the Latest

By Ray Martin,
Director of Display, Consolidated Gas Company of New York.

MOST utility men will agree that January ranks as one of the most difficult months of the twelve for merchandising. As a consequence "reconditioned" or "Class B" or just plain "price reduction" sales are put on in consideration of our post Christmas pocket books.

Such merchandising is psychologically bad because the truly "bent" pocket book will respond to only one urge; the urge for newness. Frankly, would *you* buy a reconditioned gas range—in January? Today is hardly like that of a few years ago. Now, most people first want the latest and then figure out how they can pay for it. Many get enjoyment out of possessing that which they could not afford to own if it had to be paid for at one time.

With due consideration of the above, the New York Consolidated co-ordinated all advertising activities in a campaign that had for its theme "1929 GAS PROGRESS, new appliances, new conveniences, new economics." In addition to newspaper advertising, this message was driven home by thirty window displays—all identically the same—truck posters and floor cards.

1929 is already gone as far as its usefulness in advertising is concerned, but to quote a once popular song—"The memory lingers on." At least it should linger until January 1st, 1930. Try it out next year. Your appliance sales may not materially increase in January, but February and March will prove the value of such an advertising campaign.

Domestic Survey Results in Portland, Oregon

By O. B. Server

A SURVEY of the cooking, heating and water heating equipment and appliances in the territory served by the Portland Gas and Coke Company disclosed information that should be of more than passing interest to a large number of gas merchandising men.

Out of a total of 15,617 families visited, it was found that 11,782 were using gas ranges and only 395 solid fuel, although wood is very plentiful and cheap in Portland from nothing up. When it costs you nothing you probably cut it yourself, but then one never considers his own labor worth anything, or else all would be heating with Gas.

Out here where the Gas Company is ground to powder between two sharply competing Electric Companies, the closed top range has been the gas company's salvation. The minute the company saw the first Smoothtop it knew that there was its opportunity. The dealers all fought the company but, knowing that it was right, it kept on, until now everybody is selling closed top ranges, and the dealers have almost twice as many in use as the company, although the latter started some years ahead of them. Nevertheless, between 80 and 90% of the families still have open top ranges, which means that they are old ones, and an old open top range is neither modern nor clean.

Of the 3440 families which used electricity for cooking, 2323 volunteered that the reason was because Gas is dirty. This was serious enough, but among those who were using Gas 2725 of them were of the same opinion. Of course they are wrong, but how are they going to be persuaded of their error

It is also interesting to know that out of these 3440 people, 3273 were entirely satisfied, 814 admitted that an electric range was slow, and the vast majority denied it, but—here is an interesting point: only 108 admitted it was expensive. This goes to show that nowadays the cost of operation is a minor item.

Out of 15,617 families 12,215 used gas water-heaters, while 2174 got their hot water from coils in the furnace or in the kitchen stove. The furnace is used in this part of the world over a very long period. Portland has very little real cold weather, and when it lasts seventeen days like this year the papers are full of it on the front page. Nevertheless, the total heating period in Portland is nine months, so that these people who use coils do not have to do without hot water very many weeks in the year.

As to house heating, out of the 15,617 total 3,000 use Gas besides auxiliary heating, such as 1166, for instance, who had Radiant-fires.

"Mine are Safe"
The Gas Clothes Dryer Defies Weather
Why worry about the weather when you think of washday?
The gas clothes dryer makes any day perfect for laundry work.
You are invited to inspect this modern appliance at your nearest gas office.
Telephone: TRIangle 7500
The Brooklyn Union Gas Company

The *Most Flexible* System of High Pressure Gas Storage Ever Devised!

The "Stacey Bullet" is the *only type* of high pressure storage holder which will meet present requirements and can be enlarged to accommodate future expansion of your gas distribution system.

It will be obvious, in looking at the illustration above, how easily and conveniently this can be accomplished. Assuming you already have a 6 section "Stacey Bullet" by adding the 7 sections, shown in a light tint above, you can increase your storage space over 100% at very little expenditure.

The initial cost for fabrication and erection is comparately low and the cost for extension is equally so; due to our standard construction units built on established boiler principles. This shape is also the most practical one for permanent tightness, saving of ground space and low maintenance, besides being attractive in appearance.

Let us tell you more about the "Stacey Bullet"

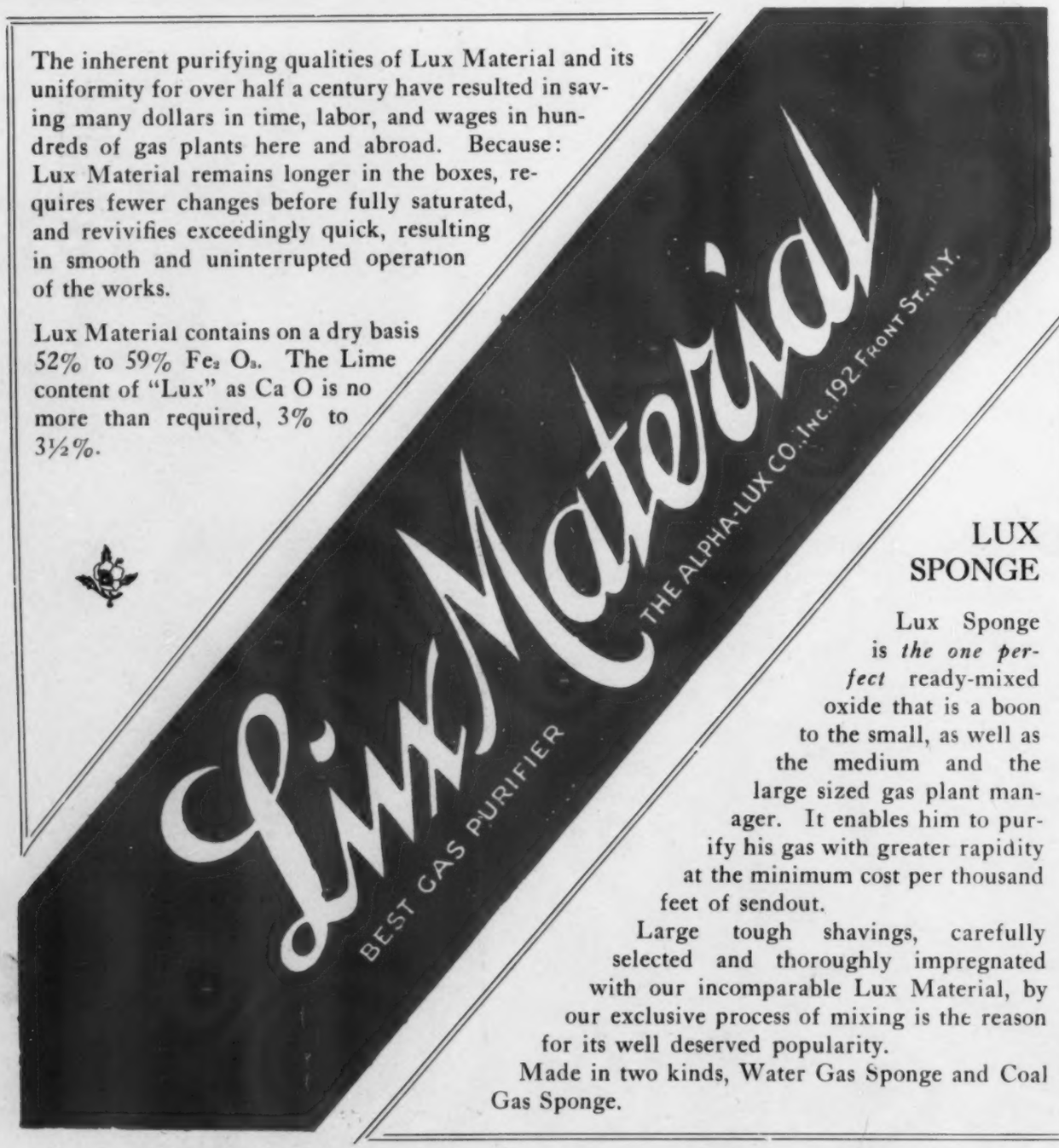
STACEY BROTHERS GAS CONSTRUCTION CO.

CINCINNATI, OHIO

JAMES E. STACEY, Pres. ANDREW J. STACEY, Vice-Pres. WAYNE STACEY, Gen. Sales Mgr.
ARTHUR A. POPE, Sec. and Treas. WILLIAM A. MILLER, Chief Eng. P. C. RODGERS, Asst. Sales Mgr.
NEW YORK OFFICE—75 West Street—P. F. McEnaney, Mgr. Tel. Bowling Green 8186
New England Representative—Eastern Service Co., Boston.

The inherent purifying qualities of Lux Material and its uniformity for over half a century have resulted in saving many dollars in time, labor, and wages in hundreds of gas plants here and abroad. Because: Lux Material remains longer in the boxes, requires fewer changes before fully saturated, and revivifies exceedingly quick, resulting in smooth and uninterrupted operation of the works.

Lux Material contains on a dry basis 52% to 59% Fe_2O_3. The Lime content of "Lux" as Ca O is no more than required, 3% to 3½%.



LUX SPONGE

Lux Sponge is *the one perfect* ready-mixed oxide that is a boon to the small, as well as the medium and the large sized gas plant manager. It enables him to purify his gas with greater rapidity at the minimum cost per thousand feet of sendout.

Large tough shavings, carefully selected and thoroughly impregnated with our incomparable Lux Material, by our exclusive process of mixing is the reason for its well deserved popularity.

Made in two kinds, Water Gas Sponge and Coal Gas Sponge.

"LUXIT H. T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. bags.

Order Sample Shipment Today!

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

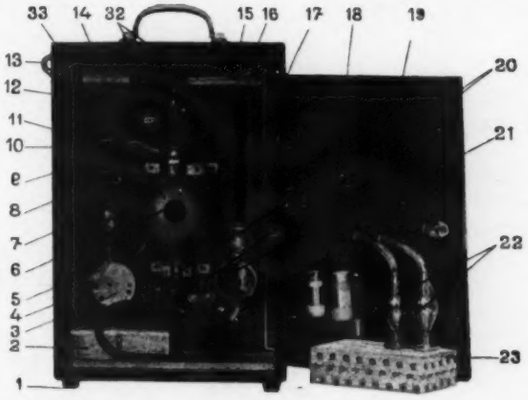
THE ALPHA—

192 FRONT STREET

HAND CALORIMETER

Dr. Strache-Kling (Loeffler Model)

For Determining the Heating Value of Gases



1. It is portable (weight under 10 lbs.)
2. It is accurate.
3. It requires only small quantities of gas for each determination.
4. It requires no water connection.
5. A determination can be made in one minute.
6. It can be operated by anybody without special training.
7. It does not require standardizing by H_2+O gas.
8. Its cost is reasonable.

The principle involved is the burning of an air gas mixture, of a known quantity of gas with a definite volume of air, in an explosion pipette insulated by means of a Dewar Vacuum jacket.

The temperature rise is recorded on an inserted thermometer. Each instrument is equipped with a computer table.

DR. OTT-LUX-GAS TESTER

For Indicating Change in Gravity of Gas, also in Heating Value of Gas

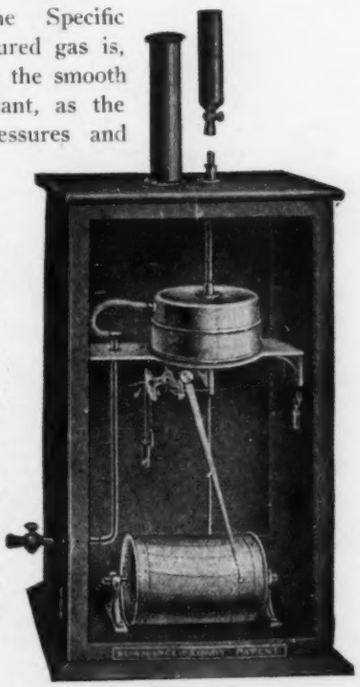
Dr. Ott - Lux - Gas - Tester is most simple in construction and operation. It combines in one operation the information usually obtained by three distinct time absorbing manipulations, namely, the **Gas Analysis, Specific Gravity determination** and **Calorimeter test.** While it is true that it cannot replace any of the three tests, where specific results are required, it is equally true that it will show any changes in the gas, which are caused by **changes in composition, gravity** or **heating value.**

LUX-RECORDING GAUGE

For Specific Gravity of Gas

(Simmance and Abady System)

To determine the Specific Gravity of manufactured gas is, today, as essential to the smooth running of a gas plant, as the determination of pressures and heating values.



In the Simmance Abady System-Lux-Recording Specific Gravity balance, we have an instrument which will give us, at a glance, not only any changes that may have occurred at any time, but furnishes a permanent record of the Specific Gravity of the gas throughout the 24 hours of the day.

LUX COMPANY INC.

NEW YORK CITY, N. Y.

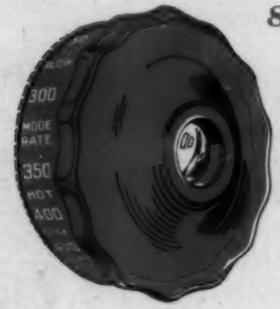
The above illustration shows the window display material that will be furnished to Red Wheel dealers free of charge for the 1929 Spring Campaign. The trim consists of a life size cut-out of mother and child, a life size cut-out of a Jinnee, or "Magic Chef" (see top of stove,) and a giant-size reproduction of the double-page four-color Red Wheel Gas Range advertisement that will appear in the April 20th issue of The Saturday Evening Post. Together, these pieces constitute the finest, most complete and most expensive window trim ever furnished to stove retailers.

ONCE every six months every dealer that sells Red Wheel Gas Ranges receives free of charge a handsome and complete set of window display material. This service forges a strong link between American Stove Company's incomparable national advertising campaign and the buying public. ¶ No other gas range manufacturer offers this desirable service or anything that approximates it. In fact, many gas range manufacturers spend less in a year for their entire advertising effort than American Stove Company spends for window display service alone.

AMERICAN STOVE COMPANY

801 Chouteau Avenue • • • • St. Louis, Mo.

LARGEST MAKERS OF GAS RANGES IN THE WORLD



LORAIN
RED WHEEL

These are the Six Famous Brands of Red Wheel Gas Ranges:

DANGLER • CLARK JEWEL • QUICK MEAL
DIRECT ACTION • NEW PROCESS • RELIABLE

Increasing the Domestic Load in the Face of Competition

Employment of Successful Sales Methods Outlined by F. M. Rosenkrans Before the Oklahoma Utilities Association Convention

DURING the last few years gas companies generally, whether they serve natural or artificial gas, have been experiencing a general downward trend in the use of gas for domestic purposes on a customer basis.

In the study of the reasons for this we find that the present day housewife is more and more getting away from the drudgery of cooking and household tasks. The growth of delicatessen stores and restaurants, the increase in the cooked food industry, the tremendous increase in the baking industry, apartment houses and laundries have all had the effect of taking away from the home the doing of those tasks which the housewife formerly performed. This has had a natural reflection in the decreasing of the purely domestic gas load and these changing conditions and results therefrom have been felt by many utility companies in natural gas territory.

To meet these changing conditions, gas utility companies are setting up their own selling organizations and those who have had selling organizations are seeking to improve them.

A Downward Trend

The Gas Service Company group, with which the speaker is connected was organized three and a half years ago, taking in a large group of natural gas utilities in Kansas, Missouri and Oklahoma. With very few exceptions the gas utilities composing this group had been experiencing a downward trend of gas sales and revenues on a customer basis. In order to stop this downward trend, selling organizations were organized in every one of the local companies from a thousand customers upward. Through these selling organizations, or New Business Departments, efforts were carried out to promote every phase of the domestic gas business. Efforts are concentrated on those commodities and those ways and means that produce the most revenue from selling and attaching a gas appliance to setting a meter. The object is to see that each customer receives the utmost in gas service.

The results of the activities of the selling department cannot be correctly measured by the number of ranges, water heaters, etc., the department has sold; they can be more properly measured in the results of maintaining and improving the domestic gas loads and revenues on a customer basis.

In the New Business Departments of the Gas Service Company group, a representative or salesman is employed for every 800 to 1500 customers. He is given this as his geographic territory and may be likened to the community or country doctor, who administers to the needs and comforts of his patients. He is held responsible (up to a certain point) for maintaining and increasing the company's gross revenue and the public relations on his territory. New Business Departments are composed of men who are trained and experienced, who sell and see that appliances sold are of approved make and, above all, promote the sale of gas in their territories. They carry out the policies of the utility to its customers and in turn see that the customer actually gets the proper kind of service. In fact, he does everything possible to bring the company the proper return from this public policy account.

Special Househeating Men

In addition to the territory representatives, men with special training are employed to advise and assist in connection with the house heating load promotion, others to advise and handle the contractor-builder trade and apartment house problems. Special men are also employed to promote the commercial and industrial phases of the business. The majority of these special men have college and engineering training.

In carrying out the sales program of the New Business Departments of The Gas Service Company group, major efforts are devoted to the promotion of the gas house heating business along scientific lines, under rates for gas which make the cost of heating to customers approximately the same as with other fuels, and at the same time provide a good return to the gas company for the load attached. Attention is also focused on the sale of every other kind of appliance which would give the customer added convenience, service and comfort in his home, such as automatic storage heaters, ranges, home laundry equipment, incinerators, gas refrigerators, etc. The representative on his territory has available all of these appliances for the customers in his district, endeavoring to fill their needs and sell them the equipment they should have as he discovers same through the contacts on his territory. From time to time special offers are made the public and campaigns conducted on some particular appliance, as it is found that through special inducements or sales on a particular article, the public is attracted to buy now rather than delay to some future time.

In larger centers we are confronted with the apartment house problem, which is indicative of the trend of modern living. In the Kansas Cities there have been many new kitchenette apartment hotels completed within the last few years, and recently our electric friends have secured the complete range and refrigerator equipment. This is true not only of Kansas City, but of other large cities of which we have knowledge. This offers considerable of a problem. The electric company sells the apartment house primary power at low rates, the apartment house owner investing in the transforming equipment and taking the transformer losses. In addition to the lighting and elevator load, it is an attractive argument to also have the kitchenettes furnished with electric refrigeration and electric ranges, whose cost of operation would be low under the additional steps in the electric rate enjoyed. Modern apartments are now rented with free electricity, telephone and other service, all of this being included in the monthly rental payment.

To meet this situation we are selling gas through a master meter so that free gas may be included to the renter of the apartment. Through the use of the gas refrigerator and special gas cooking equipment primarily designed for apartment house use, we have been able to supply the apartment house builder proper gas equipment and secure and retain loads that would otherwise have been lost to the electric company. All of this is part of the work which is carried out by the selling department.

Further competition which our electric friends are furnishing us is the fact that they are selling electric ranges and water heaters to those householders who live just beyond the reach of the present gas mains. When gas mains are extended to reach these customers, it is the most difficult proposition to take away from the housewife the electric range which she has been using, even though gas may be less expensive to cook with. We are approaching this problem through the sale to those customers of house heating, water heating and incineration and, eventually, a percentage of the customers will come to gas for cooking after a persistent effort. The customer has made a large investment in the electric range, which he is loath to throw away and again invest in a gas range when satisfactory service is rendered through the electric range.

The Solution

It is only by intensive sales efforts along all lines that the domestic loads can be improved on a customer basis. In The Gas Service Company group, through the use of selling or New Business Departments working along the above lines, we have been very successful in increasing domestic gas consumption and domestic revenues in all of the companies within the group, stopping the downward trends which were very apparent before intensive selling activities were inaugurated.

In The Gas Service Company group, serving a little over 200,000 customers, approximately 186,000 of these customers were reached through our New

Business Department last year. As a result of our New Business Activities, which is a regular part of the operations of our company, annual domestic revues of The Gas Service company group have been increased approximately two million dollars, during the past three and a half years.

In order to accomplish this, a tremendous amount of gas equipment has been sold our customers. Appliances and installations of gross sales in value in excess of six million dollars have been sold to these customers and placed on the lines in the past three years.

The Gas Service Company New Business Departments have sold over nine thousand central house heating installations, and large capacity, enclosed type space heaters for homes without basements or furnaces of over seven thousand in number. A few other domestic equipment items sold in the past three years are 5200 automatic storage water heaters and over 30,000 gas ranges and 16,800 radiant type heaters, in addition to a large amount of home laundry equipment.

In carrying out selling activities, constant study should be made of public psychology and the methods used by the big merchandisers of today. We are adopting the chain store methods of operating scattered companies of our group, that is, mass buying and mass selling. Through the chain store methods which we have adopted, better values of our gas company merchandisers are a drawing power which is winning the people. Opportunity is presented for lessening distribution costs and passing on to the customer savings that are very real and very great. It is our policy to give the greatest value of gas appliances for the dollar that it is possible to secure. It is our desire to make it easy for the customers to buy because we are competing for the dollar with the automobile man, the radio man, and all other lines of business. Through making it easy for the customer to purchase modern, efficient, and well designed appliances, we are rendering him a great service as he gets the use of our gas with maximum safety and convenience. He is not apt to criticise the company for poor service when the fault lies with the poorly designed or inefficient equipment which he may have secured if we do not render this selling service.

Time payment plans have been inaugurated and have worked very successfully, and it is pleasing to state that while we have considerable amounts tied up in merchandise ledger accounts, our bad debt losses have been extremely small, only a fraction of one per cent. Time payment plans are gauged largely according to the value of the appliance for load building, and we give a maximum of two years time for a customer to pay out on a house heating installation.

Suggestions for Increasing the Cooking Load

By J. F. Dunn

Gen. Mgr., Dun-Rite Clock Company

WITH the constantly increasing numbers of delicatessens, lunch rooms, tea rooms, restaurants, and the great volume of pre-cooked foods sold in cans by chain store grocers, and the gradual decrease in the consumption of gas for home cooking and the consequent decrease in the use of gas ranges and cooking utensils, it is certain that something is radically wrong.

To offset this it is suggested that a campaign be arranged whereby gas companies, stove manufacturers, and all classes of dealers in gas cooking appliances, combine their efforts and hit upon a slogan which in itself, would be descriptive of a new and easy method of cooking by gas, whereby the housewife would visualize this new method, through the slogan, as being automatic, convenient and agreeable, especially stressing the point that it would not be necessary to spend several hours of watchful waiting in the kitchen to cook an average meal. On the contrary, she would be doing other housework or indulging in play, inside of or away from the house during the very time that the food is being cooked.

When gas is not used for home cooking it follows that the range and the cooking utensils are not used either, and dealers all down the line will suffer from decreased sales, and it is to the interest of all that they co-operate in promoting a slogan to be decided upon. A few years ago the writer's company coined the expression, "ABSENTEE COOKING," and it is believed that that, or some similar expression, should be sloganized and used throughout the gas cooking field for the purpose stated above.

Gas is a quick cooking fuel and has to be watched or there is bound to be trouble or inconvenience as a result. This requires the constant presence in the kitchen of the great majority of women who do their own cooking against which many are rebelling. The greatest percentage of damage is done on the top burners where there is rapid evaporation, resulting in red hot utensils and charred food therein, which results in a great deal of smoke. The annual collective loss in American homes is about five to ten million dollars worth of ruined pots, pans, food and wasted gas, to say nothing of fine feminine dispositions. It may represent $5.00 to $25.00 worth of loss in the average American home. Against this we find automatic devices on electric cooking ranges, where the electric rate is low, which start and stop the heating process while the housewife is absent from the house, cutting serious inroads into gas sales. Also, the places above mentioned where community cooked foods can be purchased are so convenient that they lure housewives away from home cooking. To further offset this it is suggested that the national slogan be followed up by carefully combing the market for devices that will make home cooking more agreeable, reliable and above all, automatic. Thermostatic oven controls and home meal cooking have done a great deal towards filling the bill in this particular, but the market should be searched for every available appliance which could be used in conjunction with the oven regulators, and sold by dealers of cooking appliances to back the national slogan.

The foregoing suggestions are advanced in an effort to lift the decreasing domestic gas load out of the doldrums and place it back in its former position where it belongs.

Industrial Engineers of New England Meet at University Club, Boston

On March 8th, the Industrial Division of the New England Gas Association held its first meeting under the direction of their new officers: L. B. Crossman, Chairman, 100 Arlington St., Boston; C. H. O'Donnell, Sec'ry, 100 Arlington St., Boston; L. E. Wagner, Vice-Chairman, 100 Weybosset St., Providence, R. I.

The Board of Directors are: E. W. Berchtold, Retiring Chairman, 100 Arlington St.; Guy E. Stephen, Worcester Gas Light Co.; C. H. Hilton, Blackstone Valley Gas & Electric Co.; F. S. Morgan, New Bedford Gas & Electric Co.; H. S. Brassuer, Haverhill Gas & Electric Co.; A. B. Rogers, Norwood Gas Co.

The meeting was called to order at 12:30 when a luncheon was served to 50 members and guests of the Division.

The Chairman appointed the following committees: Publicity, E. W. Berchtold, Boston, Chairman; Membership, E. A. Weaver, 250 Stuart St., Boston, Chairman; Rate, E. W. Berchtold, Chairman.

On adjournment, the members visited two large industrial users of gas, which proved interesting and instructing.

Equipment News

Roper Self-Slide Broiler

A new feature which the Geo. D. Roper Corporation, Rockford, Ill., has incorporated in its line of domestic gas ranges is the new Self-Slide Broiler. With this new arrangement, when the oven door is opened the broiler slides out automatically. In this position, the broiler rests firmly upon substantial supports, thus eliminating all danger of the broiler rack tipping or falling. When the oven door is closed, the broiler automatically slides smoothly back into place.

This added convenience is one that should be greatly appreciated by gas range users, for with this arrangement, it is stated, it will not be necessary for the housewife to touch the hot broiler pan. The use of this broiler will eliminate the hazard of burnt fingers, an unhappy experience often occasioned by the necessity of handling a hot broiler pan.

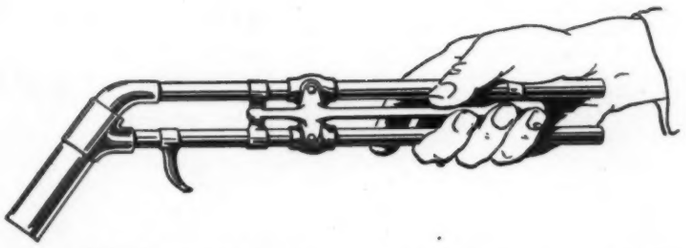
The Self-Slide Broiler will last the life of a range for its construction is very simple and substantial with nothing in the mechanism to get out of order. An exclusive feature claimed for this Roper Broiler is that broiling or toasting may be done with the broiling oven door open, as the broiler pan and rack are movable, back and forth on the guides.

The Roper Corporation is planning consumer mailing folders describing this new feature and is also planning a series of newspaper advertisements to be furnished to dealers to educate the public concerning the advantages of broiling and toasting foods.

New Automatic Torch

The St. Paul Welding & Mfg. Company, St. Paul, Minn., is putting on the market an automatic torch for use with city gas and compressed air which, it is claimed, embodies an entirely new idea in blow-pipe construction. Two valves, one for the city gas and one for the compressed air, are provided, and they are both operated simultaneously by a hand lever. The city gas valve is so constructed that once the torch is lighted a small pilot continues to burn when lever control is released. With this arrangement the torch is put into operation with hand pressure on the lever which opens up both the city gas and compressed air. Releasing the lever closes the air valve and reduces the flow of city gas to just enough for the pilot light.

Reports on the actual use of the New Automatic Torch, it is claimed, show considerable savings of gas and time as compared to that of torches previously used which required constant adjusting of the flame, or allowing the torch to burn between operations. With the new automatic torch, the flame is instantly off or on, eliminating all waste gas and time.



Some of the claims for this torch are as follows:

On touch-up work in auto body moulding the job was in the hands of the operator five minutes, while his torch was used only 2½ minutes, thus showing a saving of 50% in gas and air.

On cowl-to-Windshield touch-up work, requiring seven minutes, the torch is used twice for a total of three minutes; a saving in gas and air of 55%.

Touch-up work on door sill plates requires about ten minutes, out of which the torch is used six minutes. The saving here is 40%.

Put to use on work in the foundry core room the new automatic torch is found very satisfactory for drying large cores which are made in part and afterwards cemented together.

In heat-treating of small tools the new torch also gives efficient service.

In using the new automatic torch fire hazards and burns are reduced to a minimum, while torches whose large flame is constantly burning are a real menace to employees and property.

The new automatic torch will, it is believed, find considerable interest among production men of numerous industries where speed, economy and safety are wanted for soldering, melting, heating, and brazing of metal parts.

Full particulars will be supplied by the manufacturers.

Steel Companion Flanges

The proposed American Standard for steel companion flanges has been completed by a sub-committee of the sectional committee on the standardization of pipe flanges and fittings. Copies of this proposed standard are now being widely distributed for criticism and comment by the American Society of Mechanical Engineers.

It is the desire of the sectional committee and of the sponsor organizations that all interested persons be fully informed concerning the details of this proposed standard, while it is still in tentative form for discussion. Criticisms will be welcomed; they should be mailed to the A. S. M. E. at 29 West 39th Street, New York City.

J. & G. Safety Gas Key

After considerable research and experimentation the J & G Brass Company, Inc., South River, New Jersey, have developed a gas key for the gas range or gas heater which embodies unique features for which certain safety aspects are claimed.

It is stated that this gas key cannot be opened by children or inexperienced persons; a grown person is required to press down the key in order to open the cock to the flow of gas. Further this device is fully enclosed thereby preventing the gathering of dust, grease, etc., in the mechanism. The key is constructed of such materials as to withstand the efforts of wear, tear and corrosion to which it is likely to be subjected in service. Eight pounds pressure are required to unlock the key.

The device has been passed by the American Gas Association and Underwriters Laboratories.

The thermostat and burner can be easily and quickly attached to any style of urn.

The New Combustion Engineering Corporation Multiple Retort Stoker

Larger sizes of Multiple Retort Stokers have been entirely redesigned by the Combustion Engineering Corporation.

This new stoker is the outgrowth of many ideas and improvements which are the results of years of experience with this machine.

Practically the entire area of each retort is active underfeed area giving even fuel distribution over the entire grate surface. Parts subject to wear, such as ram box liners, lower section of ram, lower section of ram box and upper section of auxiliary rams, it is stated, are easily renewable. Likewise, parts subject to burning, such as upper sections of retorts, tuyeres, side wall tuyeres and grate bars can be easily replaced.

Proportioned to the heavy construction of the main part of the stoker, the two speed gear box is machined throughout. The hand lever on the front of the gear box operates the clutches, by means of which the stoker speed may be changed conveniently without stopping. The shear pin and coupling are conveniently located at the front of the gear box in sight of the operator.

Design of the ram box allows the depth of the retort to be proportioned to the length of the stoker. This is accomplished by adding tuyeres at the top of the retort instead of at the bottom as was formerly the practice. The advantages claimed for this design are greater capacity per stroke, low, instead of high, crank shaft speed for high capacities, increased agitation of the fuel bed, more suitable time element for the combustion of the fuel, improved operation and efficiency.

The design of the auxiliary rams located in the retorts is a decided departure from former construction. There are several of these at intervals in the retort, the number depending on the length. They receive their motion from an oscillating link which is operated from a connection to the main ram. The stroke of these auxiliary rams is variable and separate adjustment may be made on each one. The amount of motion of all auxiliary rams may be changed simultaneously by means of a hand wheel at the front of the stoker.

Grate bars at the end of the stoker have a variable travel and move in sections. When the main ram is pushing coal into the furnace, the auxiliary rams are moving in the opposite direction and the section of grate bars is moving toward the ash pit. This action serves to agitate the fuel bed when the fresh charge is being forced in and distributes and levels the fuel bed, rather than forming the characteristic furrows usually existing in the fuel bed on an underfeed stoker.

Motion of the grate bars at the end of the stoker, being opposite to the direction of the auxiliary rams, serves to clear the ash from the end of the stoker, so as to be ready to receive the next increment of ash upon the change in direction of motion of the auxiliary rams.

Each retort is built up so as to provide for expansion and to minimize the possibility of cracking. The tuyere design gives stream-line flow of air and delivers the greater part of the air sidewise into the retort, which tends toward improved operation.

The ash pit may have either grinder rolls or dump grates. Dump grates are usually installed on the smaller sizes, while clinker grinders are standard for the larger sizes of stokers. These rolls are made up of semicircular cast iron sections having replacable teeth and fitted around a square steel shaft which is operated by a pawl and ratchet arrangement. Ordinarily two grinder rolls are furnished in the ash pit, both being reversible and having variable speed.

Zone control of air pressure is afforded by the use of separate air compartments extending across the width of the stoker. The amount of air pressure may be suited to the thickness of the fuel bed directly over any particular air compartment which, with intelligent operation, will result in the best combustion conditions. Without zone control, the air follows the path of least resistance and passes to the lower portion of the fuel bed where it is not needed, resulting in low CO_2 and high flue gas temperature.

Air may be admitted through tuyeres, grate bars, side wall tuyeres and either through dump grates or walls of grinder pit. The Combustion Engineering Corporation Multiple Retort Underfeed Stoker is recommended for burning all grades of coking bituminous coal and may be applied to the largest units as well as to those of medium and small sizes. Bituminous coals, having high ash content or low fusion temperature of ash, are more suitable to burn on chain grate stokers.

Waste Coke-oven Gas Utilized in Germany

A series of main pipe lines are being constructed in Germany to distribute for use vast reserves of coke-oven gas that were formerly wasted, reports the Trade Commissioner at Berlin, William T. Daugherty.

Piping the giant reserves of waste coke-oven gas produced by Ruhr plants to supply German industries and communities is showing definite progress. Operation has already been effected of a master pipe-line collecting gases from a number of Ruhr coke plants and proceeding from Gelsenkirchen by way of Duisburg. A second master line, proceeding from Dortmund southwest to Siegen in Westphalia, to connect with the one mentioned is expected to go into operation momentarily.

Groundwork construction is also beginning on another line from pits of the Hammer district to lead eastwards to Hanover, for an eventual tie-up with lines from Hamm.

Construction to Hanover may later be connected with service supply to Berlin and Leipzig, according to plans, and they may even be allied later with further parallel ventures originating in other German coal districts, in lower Silesia, Saxony, Saar and Aachen areas. Whether or not the Central German lignite fields will associate in this gigantic service later or not is reported still a matter of speculation.

The master line already laid from the Ruhr district is constructed of wrought iron pipes welded with water gas. The pipes are 800 millimeters in diameter and of 9 millimeters wall-thickness. The line from Dortmund starts with a 700 millimeter diameter and 8 millimeters wall-thickness.

Evidence That Gas Heating is Appreciated

The Cities Service Company advises that during 1928 it sold 5,954 central gas fired house heating units, and that a conservative estimate of this will increase the gas consumption one billion cubic feet.

The reason for the good result is plain. Both the artificial and the natural gas can be depended upon and all claims that the Denver natural gas would fizzle out when cold weather arrived, have been exploded. The first two weeks in February registered sub-zero most of the day and all the night, and previous to this, back as far as Thanksgiving Day the thermometer was seldom above freezing, mostly below, the natural gas from Amarillo, Texas, 365 mile pipe line, was just as good, from every angle as it was in the summer months, and that means fully 30 units above the required 800 B. T. U.

The Engineering Index Service Indexes American Gas Journal

The American Gas Journal is fully indexed—every issue, as soon as published—in a set of cards, which thus brings ready to your hand any article on any subject in this journal or in any one of 1700 other journals in all languages. This Engineering Index Service, instituted in January, 1928, is to be found in the Public Libraries of Newark, Cleveland, Bridgeport, Baltimore and the John Crerar Library, Chicago.

Engineers in any field who live or work in New Jersey will find this mammoth index to the Latest Engineering Literature, in the Public Library of Newark, N. J., which has this journal on file. The Library is open daily from 9:00 to 9:30. It is convenient to all railroad stations. It answers inquiries by mail or by telephone.

Russia Turns Faucet for Ruud Hot Water

In southern Russia, the Soviet government is building a model workmen's village. America provided the inspiration and to America came the Soviets for modern materials and appliances.

One hundred and ninety Ruud Automatic Water Heaters have already been installed. More will follow.

Important Higher Court Decisions Involving Gas

By Leo T Parker

AN advantage of officials of gas companies obtaining reliable legal information in simplified form is avoidance of liability. Obviously, a person who understands his legal obligations is less likely to perform acts that will result in liability, when compared with a person who is unfamiliar with the law, or one who relies upon "hear-say" information which, in the majority of instances, is quite undependable.

Moreover, frequently the records of fresh higher Court cases may be advantageously utilized in defending a suit, because the cases hereinafter explained are reported only in the advance sheets of Court's opinions of which no index is readily available.

Distinction Between Common Law and Workmen's Compensation Law

Almost all states have adopted laws requiring firms employing several persons to perform certain duties, such as filing specific reports with the state, giving information of the number of their regular employees, the duties of such employees, and wages earned by employees. In many instances, the employers are required to contribute to a fund set aside for compulsory payment of compensation to injured employees.

It is important to know that employers should carefully comply with these statutes, since failure to do so may result in greatly increased liability. This is true because the Courts have consistently held that an employer, who fails to comply with Workmen's Compensation Laws, not only is subjected to payment of heavy penalties but, also, automatically becomes liable in damages for all injuries sustained by employees, irrespective of the provisions of these laws which, under ordinary circumstances, may reduce the common law liability.

It is true that under the common law an employer is not liable for injuries sustained by an employee as a result of the latter's own negligence. On the other hand it is interesting to know that, in Holton vs. Clayco Gas Company, 145 S. E. 637, a workman employed by a gas company to lay a gas pipe line filed suit against the gas company for injuries sustained when he tripped over a wire which had been stretched across a path from the roadway to the company's line. However, in this case the employee introduced testimony showing that the employer had failed to abide by the state compensation laws.

In view of this evidence the Court held the gas company liable, and said:

"When an employer comes within the purviews of the Workmen's Compensation and is not protected by it, and a suit is brought against him for an injury occurring to one of his workmen, received in the course of his employment and arising out of it, he (employer) cannot interpose as a defense assumption of risks, or negligence and carelessness on the part of the workman, where the employer has been negligent himself, and from which negligence the injury resulted."

Therefore, it is quite apparent that an employer who fails to conform with the state compensation laws materially increases his chance of financial losses resulting from injuries to employees.

When Employee May Sue Under Common Law

Frequently, injured employees prefer to sue for damages under the common law, rather than accept the amount of compensation fixed by Workmen's Compensation Laws. This circumstance may exist where the injury resulted from negligence on the part of the employer, and the employee believes that a jury will allow a verdict for damages for an amount greater than the compensation authorized by the compensation laws.

However, an employee who elects to file suit under the common law is barred from relying upon the Workmen's Compensation Laws to obtain positive payment, should the suit terminate adversely for him, and vice versa.

Also, it is important to know that employees who prefer to sue for damages under the common law are required to present testimony to a jury.

For example, in the recent case of De Feo vs. People's Gas Co. of New Jersey, 142 Atl. 756, suit was instituted by a citizen named De Feo and his wife to recover compensation for injury to the health of the wife caused by drinking water from their well, which had become polluted by gas escaping from the pipes of the gas company.

There was evidence that the pipes leaked, and that the gas escaped killing the vegetation on the premises of De Feo, and that the gas polluted the water in the well. Also, Mr. De Feo had called at the office of the gas company and notified the person who should have remedied these conditions. The gas company took no steps to remedy them.

However, the judges of the Court refused to render a verdict, saying:

"This evidence made the question of liability one to be determined by the jury, and not by the Court."

Duty of Employer to Employee

It is well established that a gas company is liable in damages for injuries to employees resulting from negligence on the part of the company's executives and foremen to maintain a reasonably safe working place. However, irrespective of the working conditions, an employee is not entitled to damages, under the common law, where an injury is a direct result of negligence of a fellow workman.

On the other hand, a gas company always is responsible in damages for injuries sustained by any employee as a result of negligence of a superior, as a foreman.

For instance, in Natural Gas & Fuel Corporation vs. Alotto, 11 S. W. (2d) 769, it was disclosed that an employee was seriously injured by an automobile while he was standing in the street making connections to the main gas line.

The employee brought suit against the gas company to recover damages for the injuries received while making the meter connection, alleging that he was in the employ of the company at the time the accident occurred and that it failed to use due care to furnish him a reasonably safe place in which to work. Also, the employee proved that his foreman committed acts of negligence by inducing him to go in the ditch and tighten up the connections promising to stand there and keep watch for the traffic, but he failed to do so.

In view of this testimony, the Court held the employee entitled to recover for the injuries sustained, stating important law to the jury, as follows:

"If you find from a preponderance of the evidence that the plaintiff (employee) was in the employ of the gas company and was working for it under the orders and instructions of its foreman, and you find from the evidence that he was injured on account of the negligence of the gas company, its agents, servants, or employees, it will be your duty and you are told to find for the plaintiff (employee)."

Injury Must Arise from Employment

Another important phase of the law on this subject is that an employee is not entitled to damages, under the common law, nor to the compensation specified by the Workmen's Compensation Laws unless the injury arises from the scope of the employment.

Very often, people confuse the terms "within the scope of the employment" and "in the service of the employer." However, it is established that an employee who is injured "while serving his employer," may not be "acting within the scope of the employment" when the injury is sustained. Under the former circumstance, the employee is entitled to compensation *only* when the act resulting in the injury is intended to benefit the employer, but the employee always is entitled to compensation for an injury sustained, *as a result of the negligence* of his employer, while working within the scope of the employment.

The law is well settled that an injury

arises out of an employment, for which the employee is entitled to compensation, *when it occurs in the course of the employment and is the result of a risk involved in the employment or incident to it.*"

The injury is thus a natural or necessary consequence or incident of the employment, or of the conditions under which it is carried on. Sometimes the employment will be found to directly cause the injury, but more often it arises out of the conditions incident to the employment.

However, in every case there must be apparent some casual connection between the injury and the employment, or the conditions under which it is required to be performed, before the injury can be found to arise out of the employment for which the employer is liable.

In other words, an accident arises "in the course of the employment" if it occurs while the employee is doing what he may reasonably be expected to do during the hours of his employment, and at a place where he may have good reasons to be during that time. Moreover, an injury arises "out of" the employment when the risk resulting in the injury may have been contemplated by a reasonably prudent employer.

For example, in the recent case of Schockley vs. Morristown Co., 11 S. W. (2d) 900, the Court explained the law on this subject, as follows:

"An employee while at work for his employer may do those things which are necessary to his own health and comfort, even though they are personal to himself, and such acts will be considered incidental to his employment. And while recognizing, as we do, the general rule that an employee cannot be awarded compensation when he has turned aside from his employment for his own purposes, there are many departures by an employee which do not deprive him of compensation, for example in seeking toilet facilities, in preparing for the street, in quenching his thirst, in eating a lunch, in seeking fresh air, in seeking shelter from a storm, in protecting himself from cold, or even in saving his personal belongings from injury."

Liability of Municipality for Injuries to Persons Other than Employees

Generally speaking, a municipality is liable in damages for the negligent acts performed by its employees in the exercise of powers and privileges conferred upon it for private gain or advantage, usually termed proprietary or ministerial powers.

A characteristic example of a service undertaken by cities and towns in their private or proprietary capacity is the distribution of gas to their inhabitants for domestic and industrial purposes. This service is one that is often performed by private gas companies, and when assumed by a municipality corporation it is a purely commercial transaction between the municipality as a manufacturer and the citizen as a customer.

On the other hand, it is well established that a municipality it not liable for the negligent acts of its employees performed in its governmental, legislative or discretionary powers.

Therefore, in many cases, where municipalities are sued for damages, caused by negligence of its employees, the complaining party is not entitled to a verdict because the source of the injury arises from a governmental function.

For instance, in Foster vs. Capital Gas & Electric Co., 265 Pac. 81, it was disclosed that gas escaped from a municipal gas main causing an explosion that damaged a house. The owner of the property sued the city for damages equal to the cost of repairing the building.

However, the Court held the city *not* liable, saying:

"Ordinarily, cities and other municipal corporations in the exercise of their governmental functions are not liable in damages for any neglect, or even wrongdoing, of their officers in the discharge of such duties unless such liability is expressly imposed upon them by law. . . . We believe it the better and more reasonable rule to hold that (except in injuries arising from defects in streets or highways) the municipality is not liable when engaged in performing governmental functions."

Gas Company Liable for Defective Pipe Joint

Generally speaking, gas companies are liable for injuries to customers, and other persons, resulting from the negligence of its employees. Moreover, a gas company is responsible for damages and injuries caused by an explosion of gas that leaks from defective joints of its own equipment which should, by the application of ordinary care, have been discovered by its employees.

For instance, in Shideler vs. Capital Gas & Electric Co., 266 Pac. 741, a gas company supplied gas to a residence through a service pipe which entered through the basement wall and connected with a meter which was hung just inside, suspended from the service intake pipe and the outlet pipe and connected with the fixtures in the house.

One day the owner of the house struck a match near the gas meter and an explosion occurred, severely injuring him and damaging the building.

The owner sued the gas company for damages and proved that the gas had leaked from the joint *between the meter and the inlet pipe.*

The lower Court held the gas company liable and the higher Court sustained this verdict, saying:

"After the explosion, employees of the gas company immediately went to the house and found the meter melted from the supporting pipes and lying on the basement floor. . . . The gas must necessarily have escaped through some leak. We are of opinion the evidence was sufficient to warrant the finding of the jury that the meter was defective in this joint."

When Gas Employees are Negligent

At times, persons, as water works employees, are compelled to enter various places which might contain escaped gas which may explode.

Generally speaking, a water works employee suing a gas company for injuries caused by exploding gas is bound to prove negligence on the part of the latter's employees.

However, the circumstances may be such that a Court will *imply* that the gas company is responsible for the explosion, particularly if no one except the latter's employees ordinarily enter the place in which the explosion occurred, or if the company is obligated to maintain the equipment in good condition.

For illustration, in Smith vs. Southern Counties Gas Company, 264 Pac. 532, it was disclosed that in 1922 a gas company constructed a pit four feet by six feet and five feet deep at the intersection of streets being used by virtue of a franchise. The pit was built of concrete, and the pipes of the gas company had been laid and the valves placed before the cement was poured, as the pit was constructed for the purpose of making accessible three shut-off valves and a regulating valve in the gas line. For several years the pit was inspected monthly by the gas company.

One day Harvey H. Smith, an employee of a water company, went to the intersection of the streets for the purpose of shutting off the water. He went into the pit, not knowing that it belonged to the gas company or that the gas company's pipes were located therein. Being unable to see, he struck a match, and an explosion occurred, causing severe injuries.

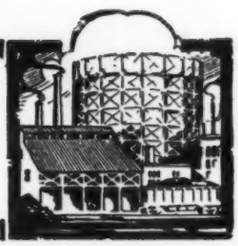
The water works employee sued the gas company for damages but was unable to prove that the explosion was caused by negligence of the former's employees. However, since only the employees of the gas company ordinarily were admitted into the pit, the Court held the water works employee entitled to recover $2,500 damages, saying:

"In the present case the pit containing the gas pipes had been used for more than a year before the accident happened, was under the management of the gas company, and the accident was such as in the ordinary course of the things does not happen if those who have the management use proper care. . . . With the presumption of negligence, however, arising from the explosion, the question was whether the gas company had met the burden imposed upon it of providing the exercise of due care."

Consolidation Coal Company Appoints Managers

Mr. R. C. Gilbert was recently appointed Manager of the Detroit, Michigan office of Consolidation Coal Company with headquarters in the Barlum Tower Building, vice Mr. J. H. Baker, resigned.

NEWS OF THE GAS INDUSTRY



Seek to Bring Natural Gas to Atlanta

Application for a franchise to distribute natural gas to citizens and industries of Atlanta has been filed with the city clerk by the Atlanta Natural Gas Corporation, a subsidiary of the Southern Natural Gas corporation having extensive natural gas fields in northern Louisiana.

The petition states that the firm plans to bring natural gas to Atlanta from its Louisiana fields, delivering it to customers at rates to be determined by the state public service commission. In order to do this, permission is asked to use the streets of the city for the purpose of laying and maintaining pipe lines, laterals, appurtenances, appliances and equipment.

At present negotiations are under way between officials of the Atlanta Natural Gas company and those of the Central Public Service corporation, of Chicago, which recently purchased the gas properties of the Georgia Power company, looking to the utilization of the present system in Atlanta for natural gas.

To Build 135 Mile Gas Line

A new gas line from Petrolia to Fort Worth, Texas, continuing on to Dallas, for a total distance of 135 miles, is planned by the Lone Star Gas Company, acording to an announcement made recently by L. B. Dening, president.

The line will be of 20-inch pipe with a daily capacity of more than 100,000,000 cubic feet, and will cost several million dollars. It will be the largest gas line in the northern part of the state, and will give the Lone Star Gas Company four main lines reaching from Fort Worth and Dallas from the Northwest and North.

Two lines, one 10-inch and one 16-inch now bring gas in from the Northwest, tapping the Texas Panhandle, the Petrolia and Oklahoma fields, and a third comes in on the north from Oklahoma. There are also two large mains entering from the South, bringing gas from the West Texas fields.

The new carrier will not only afford additional service for Fort Worth and Dallas, but will benefit many other cities and towns served by this system. It will enable gas from West Texas fields to be diverted to cities south of Dallas during cold weather, thus increasing the supply for Waco, Temple, Cleburne, Georgetown, Waxahachie, Corsicana, College Station, and others.

Convention Calendar

April

10-11 Pennsylvania Gas Association. Annual Meeting, Benjamin Franklin Hotel, Philadelphia, Pa. G. L. Cullen, Harrisburg, Pa., Secretary.

15-17 Mid-West Gas Association, Annual Meeting, Minneapolis, Minn. A. W. Schmitt, Des Moines, Iowa, Secretary.

23-25 Southern Gas Association, Annual Convention, Memphis, Tenn. J. P. Connolly, Secretary, 141 Meeting St., Charleston, S. C.

24-25 New Jersey Gas Association. Annual Meeting, Trenton, N. J. Louis Stoecker, 80 Park Place, Newark, N. J., Secretary.

25-26 Empire State Gas & Electric Association. Annual Meeting, Gas Section, Niagara Falls, N. Y.

May

1-2 Indiana Gas Association. Annual Convention, Gary, Indiana. F. W. Budd, Secretary, Muncie, Indiana.

6-9 Convention, Natural Gas Department, American Gas Association, Kansas City, Mo.

6-11 Exposition of Chemical Industries, Grand Central Palace, New York City.

June

3-6 National Association of Purchasing Agents. Annual Convention, Hotel Statler, Buffalo, N. Y. B. W. Hall, Asst. Sec., 11 Park Place, New York.

13-14 Canadian Gas Association, Annual Convention, Ottawa, Ontario. G. W. Allen, Secretary, 7 Astley Ave., Toronto.

Georgia Power Company Sells Gas Properties

With the sale of all of its gas properties to the Central Public Service Corporation, of Chicago, as announced March 8, the Georgia Power Company plans to retire entirely from the gas business on or about May 1, and concentrate its efforts to the development of the electric light and power industry in the state.

The gas producing and distributing properties in Atlanta and Suburbs, Macon, Athens & Brunswick change hands through the sale.

Colonel A. E. Peirce and associates, of the Central Public Service Corporation of Chicago, the purchasers are engaged extensively in the manufacture and distribution of gas in a number of places throughout the country, including the following cities in Georgia, namely: Augusta, Rome, Griffin, Waycross and Valdosta.

The gas properties will be delivered to the purchasers on or about the first part of May, 1929.

The Brooklyn Union Gas Company Takes Part in the 38th Annual Food Show

The Brooklyn Union Gas Company, as has been its custom for many years past, participated in the recent Brooklyn Annual Food Show.

The gas company's exhibit was comprised within an aisle bounded space thirty feet square upon which with a slightly raised platform as a base, diagonal walls were built from the four corners to a rectangular structure rising from a central position. The central edifice was surmounted by a silhouette representation of the Brooklyn skyline above which projected a replica in miniature of a waterless gas holder on the sides of which appeared "Brooklyn's Fuel Bin." The central structure was used as a booth in which the Home Service representatives demonstrated domestic cooking and its value in home economy and answered questions of more than 20,000 visitors. The four triangular outer booths each upon an aisle contained exhibits of interest. One booth was devoted to gas fired refrigerators, one booth to gas ranges, and incidentally measures were taken to make this portion of the exhibit express strictly up-to-date features of gas ranges for style is beginning to show here as well as in women's hats—all the latest colors were shown, and as the show included the period surrounding the 17th of

Space heater section, Brooklyn Union exhibit

March, the handsomest range in the display was enameled in a very pleasing shade of St. Patrick's favorite color.

Space heating appliances were shown in the adjacent booth, while laundry and water heating was shown in the fourth booth. The structural form of the booth proved a superior design for appliance display. From an artistic standpoint it was thoroughly modernistic, departing materially from previous conceptions of fitness in this particular.

Calgary Gas Company Outlines Large Program of Construction

The Canadian Western Natural Gas, Light, Heat & Power company, which supplies natural gas to Calgary, announces that 30 miles of new mains will be laid in Calgary this year at a cost of approximately $325,000, Trade Commissioner J. Bartlett Richards, Winnipeg, reports to the Department of Commerce.

The company's announced program is the largest undertaken since the original installation of the company's plant in 1912. Last year 18 miles of mains was constructed. In addition to the new mains 3 additional regulator stations will be built to step the gas pressure down from the high pressure at which it is piped to the various districts of the city to a pressure suitable for domestic use.

New Utility Building for Joliet

The new three-story office building being erected in Joliet, Ill., for the Western United Gas and Electric company and the Public Service Company of Northern Illinois, is nearing completion and will be occupied early in April by the various branches of the utilities' organizations Although only three stories high, it is one of the most modern office structures in the city and its walls have been built strong enough to carry seven additional floors. The Western United Gas will occupy the entire main floor and the other utilities offices will be on the second and third floors.

A Fine Gesture

Memoralizing the name of John O'Connell, who, when he died July 13 last, was both in age and years of active service, the oldest employe of the Consolidated Gas Company of New York, the immense gas plant bounded by the East River, First avenue, Twentieth and Twenty-second streets, has been officially named the "John O'Connell plant."

Of his eighty-nine years of life, John O'Connell gave seventy-two continuous years of service in the gas plant which now bears his name. In his annual statement to stockholders on February 25 last, Mr. Cortelyou, President of the Consolidated Gas Company, in referring to the death of O'Connell, said: "His record of unbroken service in one plant (or station) is unique in the history of the gas industry of this Nation, and probably of the world, while his devotion and loyalty during the whole of that period were invaluable."

In Memory of Frank Frueauff

The Public Service Company of Colorado, Denver, completed its new laboratory building at Third and Lipan streets, and the keystone carries the words: "Frueauff Service Station." This is in memory of its late vice president, one of the founders of the Cities Service. Within the building are the gas and electric meter testing, repairs etc., chemists, engineers where every problem confronting the organization may be handled without any loss of time.

Something Brand New

Something new in the way of schooling was tried March 25 to 30 at Purdue University in West Lafayette, Ind., when women employed in the utility industry in Indiana and adjoining states attended a five-day short course on gas and electrical household equipment. Dean Mary L. Matthews of the Purdue School of Home Economics was in charge of the course. Representatives of the university, utility associations and allied industries appeared on the program.

The program was planned so that lectures and addresses were combined with exhibits and laboratory demonstrations. The laboratory work included actual demonstrations in gas and electric ranges, ironers, washers and various types of cleaners and other similar mechanical equipment.

Peru Wins Mulholland Trophy

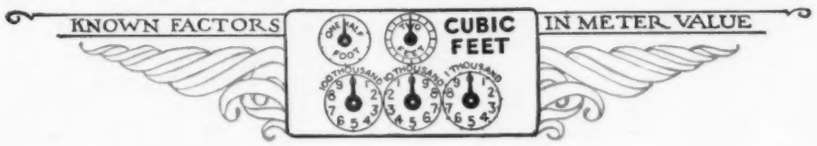
The Mulholland Trophy, a silver cup awarded annually by S. E. Mulholland, president of the Kokomo Gas and Fuel Company and vice-president of the Northern Indiana Public Service Company, for sales proficiency, was presented this year to the Peru sales force. The presentation was made at a tri-monthly meeting of the salesmen and managers of the southern division of the Northern Indiana company held at Kokomo. E. J. Kelley of Fort Wayne, general superintendent of the company, made the presentation. Herman Horstman is manager of the Peru force.

Following the dinner, talks on selling were made by Mr. Kelley, F. X. Mettenet of Hammond, assistant to the vice president of sales and E. Frank Gardner of Chicago, publicity director for the Midland Utilities Company.

Surveying for St. Louis Natural Gas Pipe Line

Engineers for the Mississippi River Fuel Company of St. Louis, are making a survey of the route for the 22-inch natural gas line, which is to be built from the Louisiana gas fields to St. Louis, Missouri. J. C. Owen, in charge of the survey, said land had been purchased for the five gasoline manufacturing stations to be established at regular intervals. One will be near Fredericktown, Missouri, and the other four will be in Arkansas and Louisiana. One has been located near Biggers, Arkansas.

Plans for the gas main have been completed for nearly a year and the company hopes to have natural gas in St. Louis by December 1.



THE LINDERMAN ORIFICE METER

A New Standard for the Accurate Measurement of Gas in Large Volumes

The Growth of American Meter Manufactories

*****

New York
1836

Philadelphia
1848

Albany
1855

Boston
1860

Baltimore
1866

Erie
1888

Chicago
1896

San Francisco
and
Los Angeles
1901

Kansas City

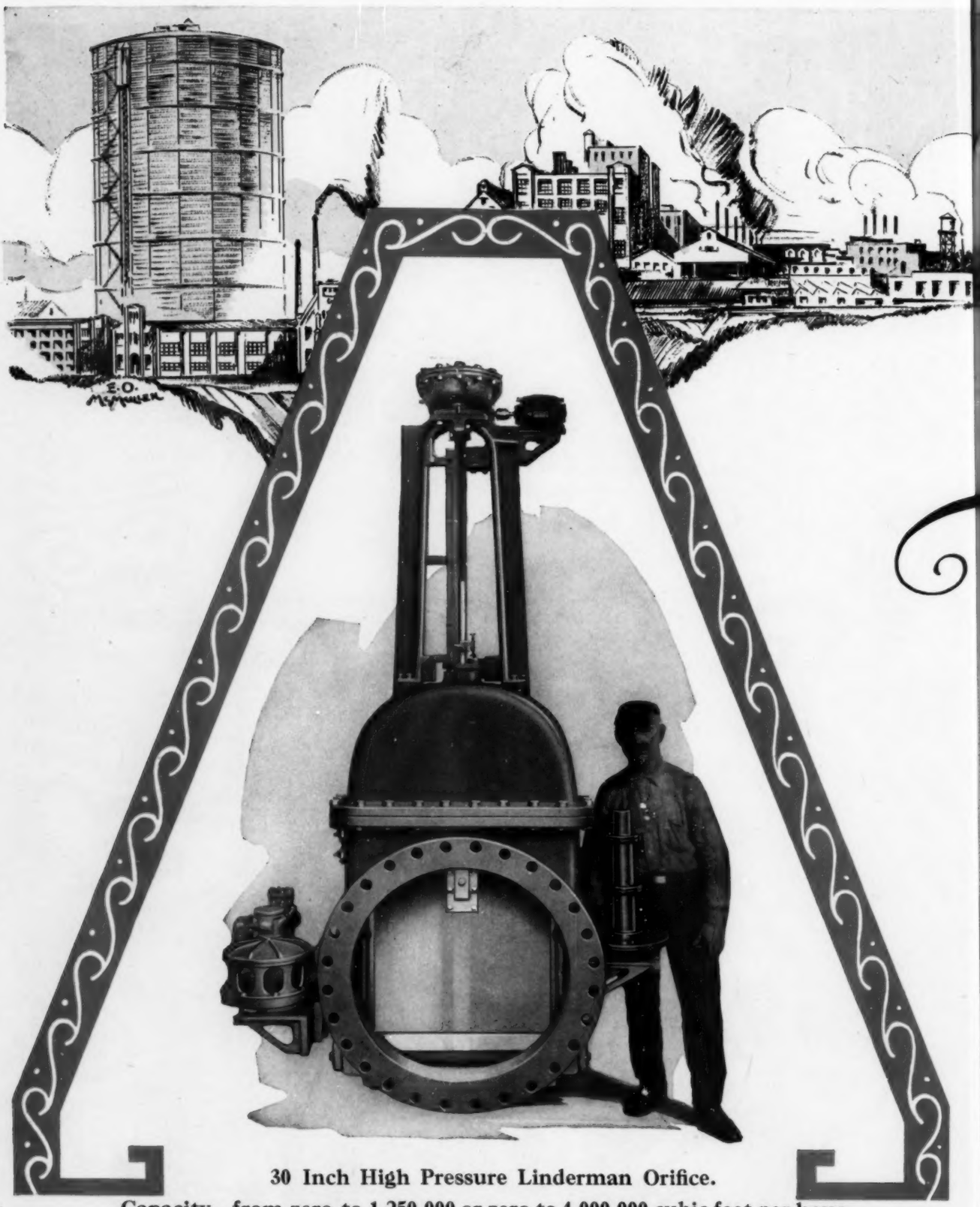
THE Linderman Orifice Meter—invented by Garrett B. Linderman, Jr.—is presented on subsequent pages. It has proved conclusively its value and importance in the field of Large Volume Measurement.

More than four years of experimental research and practical test in service have demonstrated that the Linderman Orifice Meter is unsurpassed in serving the purpose for which it is designed and constructed.

It is built on sound principles, skilfully adapted to the accurate measurement of gas in large volumes under conditions generally obtaining in a modern gas works.

The Linderman Meter is fully described on pages 91 to 99 of American Meter Company's General Catalogue for 1929.

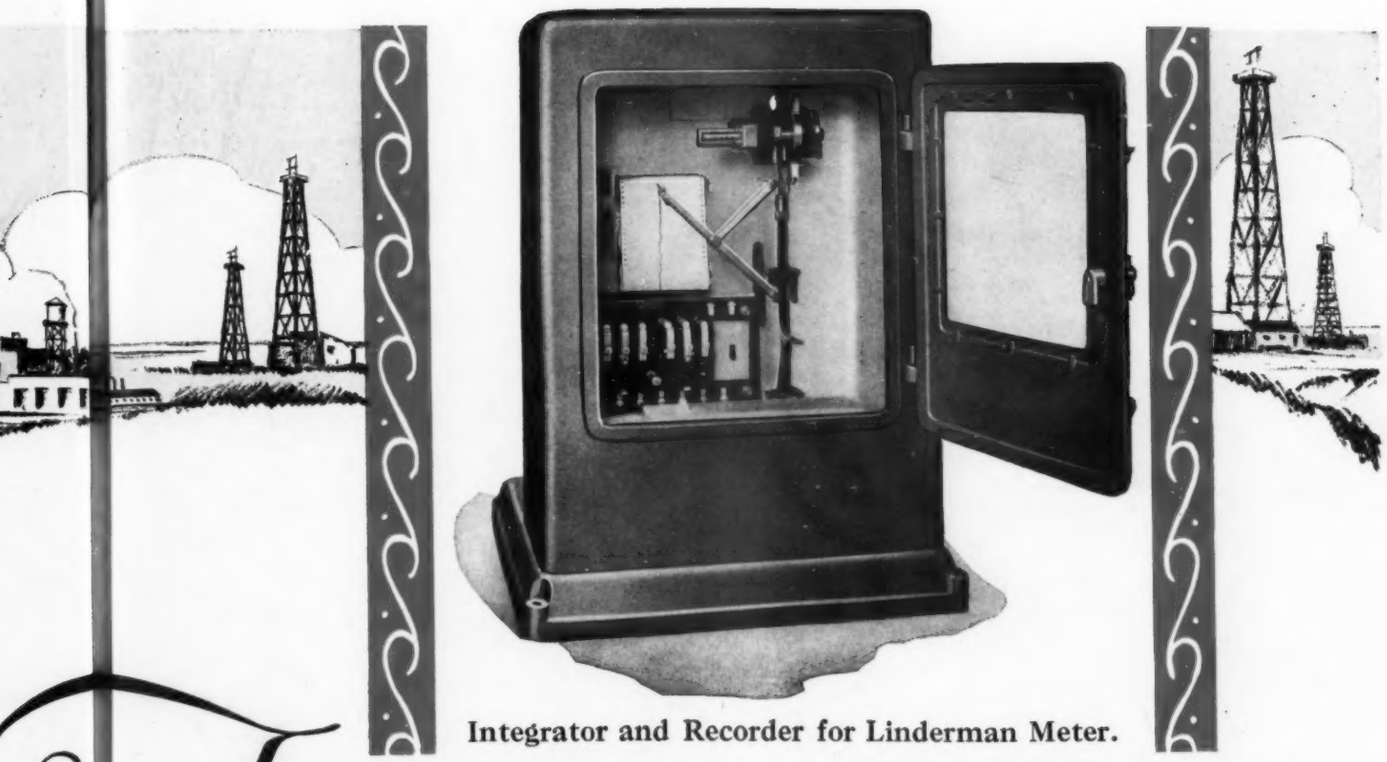
AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET



30 Inch High Pressure Linderman Orifice.

Capacity—from zero to 1,250,000 or zero to 4,000,000 cubic feet per hour—depending upon line pressure.

Pressures up to 100 pounds per square inch.



Integrator and Recorder for Linderman Meter.

The Linderman Orifice Meter

Features

1. Range from Zero to Full Capacity of Meter.
2. Corrects for Temperature, Pressure and Specific Gravity.
3. Direct Reading.
4. Small space required.
5. Can be installed in any position.
6. Graphic Record of rate.
7. Economical to operate.

The Linderman Meter can be furnished for 8-inch, 12-inch, 16-inch, 24-inch and 30-inch pipe sizes. Maximum capacities range from 25,000 to 1,250,000 cubic feet per hour on low pressure—from 30,000 to 4,000,000 cubic feet per hour on high pressure.

METRIC METAL WORKS
ESTABLISHED · 1868
· ERIE · PENNSYLVANIA ·

LINDERMAN ORIFICE METER

Guaranteed Accurate to Within One Per Cent from Zero to Full Capacity

Description

THE Linderman Meter is of the orifice type, in which the measurement is obtained from the size of the aperture. It is made up of a main body casting similar to a large gate-valve, a controller, and an integrator. The orifice or gas way has a sliding gate, movable across its face, and is calibrated for all positions of the gate.

A centrifugal blower is provided as part of the integrator, which develops a pressure proportional to the density of the gas. This pressure is transmitted to the controller, which consists of four interconnected chambers containing a liquid, and one float which operates two contacts, which in turn control the motor operating the gate. The chambers of the controller are so designed that the gate is kept in such a position, in relation to the flow of the gas, that the coefficient is maintained proportional to the rate of flow of the gas through the meter, irrespective of any change in the specific gravity, the temperature or the pressure of the gas.

The integrator consists of a vertically reciprocating member, the vertical movement of which is limited by the surface of the cam. The surface of this cam is so cut that the drop on the cam is proportional to the calibration of the orifice. It is connected to the sliding gate by a flexible shaft which rotates it so that proper calibration is always directly under the reciprocating member. In other words, the movement which this member is permitted to make is maintained proportional to the coefficient of the orifice, and hence to the flow of the gas. This movable member is operated by a small electric motor every ten seconds, and its movement is integrated through a double roller ratchet (in which there is no slippage) and is recorded in cubic feet on a direct-reading index.

The meter is guaranteed accurate to within one percent from zero to the full capacity of the meter.

For further information please write to Metric Metal Works

METRIC METAL WORKS
ESTABLISHED 1888
ERIE · PENNSYLVANIA

Record Gas Well

What appears to be the biggest gas well ever drilled in southern Indiana was brought in by the Indiana Oil & Gas Corporation south of Francisco recently. Gas was struck at a depth of 1,676 feet after the drill had gone several inches into the sand. An interesting feature is that this producing stratum is above the Newton sand, where a strike was expected. The big gasser ran away for three days defying all efforts to check it with water and mud.

S. M. Newton president of the corporation, was there from New York. So wild was the producer that no figures can be given on its production. There are several wells in the field producing 2,000,000 and 4,000,000 cubic feet a day, but the new strike appears to far exceed this amount.

Natural Gas News in Little Rock

Following the recent anouncement of the purchase of the Little Rock Gas and Fuel Company from the Dawes brothers of Chicago by the Arkansas Natural Gas Corporation, the following officers were elected: Henry L. Doherty, president of the parent company. was elected president. W. A. Jones, F. R. Coates, and L. F. Musil of New York and D. W. Harris of Shreveport, general manager of the Arkansas Natural Gas Corporation, are vice presidents. R. W. Curren was elected general manager, E. N. Watkins, secretary of the Arkansas Natural, secretary: L. E. Smith and J. G. Hamilton of Shreveport, assistants: E. H. Johnson of New York. treasurer, and B. R. Muirhead of Shreveport, assistant treasurer.

Little Rock will be the general distribution point for the properties of the Arkansas Natural Gas Corporation, with Mr. Curren in charge there.

Approximately 75 employees of the Little Rock Gas and Fuel Company were guests at a banquet recently at the Hotel LaFayette to form a closer contact between them and the new officers of the recently reorganized corporation, including R. W. Curren, manager.

Among the speakers on the program were: Mr. Curren, who succeeds W. C. Booth as manager; E. N. Watkins of Shreveport, secretary of the Arkansas Natural Gas Corporation, of which the Little Rock concern is a part: W. H. Buckley of Shreveport, formerly with the organization, and Hughes B. Davis of Kansas City, general director of the customer-ownership plan of the Cities Service Company, the parent corporation. Mr. Curren welcomed the employees and Mr. Watkins gave a brief history of the Arkansas Natural Gas Corporation.

Mr. Davis, who is planning to launch a customer-ownership campaign in Arkansas in the near future, gave an illustrated address on the subject, pointing out that between 14,000 and 15,000 employees of the company are engaged in selling these stocks.

Introduce Bill to Employ Attorney and Engineer to Represent Public in Rate Cases

A bill has been introduced in the Senate of the Indiana General Assembly by Senator A. H. Lindley authorizing the attorney general to employ an attorney and an engineer to represent the public in rate increase cases.

The bill provides that the deputy attorney general, appointed for four years at a salary of $6,000 a year, shall be assigned to the public service commission to represent consumers. The engineer would receive the same salary and also be appointed for four years.

These deputies of the attorney general, the bill provides, would become active in cases only after a remonstrance against the proposed rate increase had been filed by ten or more patrons of the utility.

The bill provides that the deputy attorney general must be a lawyer of recognized ability and "especially qualified" for such duty.

Senator Lindley explained the purpose of the bill is to provide an attorney who could devote all his time to studying the necessity of the proposed rate increases and assist city attorneys and others in opposition to such increases.

James M. Ogden, attorney general, when he took office, appointed Samuel R. Artman, former chairman of the public service commission and a former member of the state industrial board, as a deputy attorney general. As such, he will appear in utility cases, but most of his work will be to represent the commission in appeals from rate decisions.

Great Quantities of Coal and Oil on Public Domain

On the public domain, says the Geological Survey, there are 30,000,000 acres of coal land which contain 200,000,000,000 tons of fuel for the future. There are 65 developed oil and gas fields with an annual production of 33,000,000 barrels of oil. There are 4,000,000 acres of oil shale from which possibly 60,000,000,000 barrels of oil can be extracted when high prices arrive to warrant the higher cost.

Gas Making Equipment Being Completed at Quincy

Three new gas ovens for the gas plant of the Central Illinois Public Service Company, Quincy, Ill., are in course of construction and will be finished about the time the new gas holder, now being erected with capacity of 300,000 cubic feet, is finished. Each of the ovens will require 4,400 pounds of coal at one firing and will increase the gas production capacity of the plant 20 per cent. Completion of this gas unit will make the Quincy plant one of the best equipped properties of the utilities company in the middle west.

Public Utility Earnings Show Large Increase

As a measure of the earnings of public utilities in the United States there is regularly gathered by the U. S. Department of Commerce a set of reports from 95 companies including a number of holding companies operating large systems selling gas, electric light, heat, power, etc. The figures reflect accurately the trends in public utility company business during recent years.

Results recently announced give final totals for the calendar year 1928 which show that gross earnings during that year exceeded those of the preceding twelve months by 4.8 per cent. Net earnings increased even more substantially, by 10.6 per cent over those of 1927. The following figures for this large group of companies show the significant and encouraging upward trend in both gross and net earnings.

Year	Gross Earnings	Net Earnings
1925	$1,827,000,000	$632,000,000
1926	1,995,000,000	715,000,000
1927	2,113,000,000	775,000,000
1928	2,214,000,000	857,000,000

It will be noted that there has been not only an upward trend in both figures, but an encouraging upward trend in the percentage of gross earnings which appear as net earnings.

New Ovens Go Into Service at Rockford

A battery of 21 new Koppers ovens recently went into service at the Rockford, Ill., Gas and Electric service plant, supplanting the old retort gas plant and completing a program of modernization of the Rockford plant which William S. McMaster, superintendent, has directed over the last year. The retorts are being kept warm for a few weeks in order to meet any emergency which may arise during the first weeks of adjustment of the new ovens. The ovens, which already have been tested over a long period, are producing 2,500,000 cubic feet of gas daily, which can be increased a half million cubic feet, through shortening of the coking time. The gas making plant is producing about 160 tons of coke daily, an eighth of which is used in the plant.

Laying New Gas Main

The Iowa Railway and Light Corporation is laying a new four-inch gas main between Ames and Nevada, replacing the two-inch main which has been in service. The new line will have four times the capacity of the old and according to J. H. Ainsworth, local manager, the corporation will lay a main westward from Marshalltown to Nevada, serving State Center and Colo., supplementing the Nevada supply. Ames and Nevada will have 48-hour service storage capacity, both cities being served from the Boone plant.

Gets Splendid Gas Well

The Oklahoma Public Service Company, during middle March brought in a gas well in the Chickasha Oklahoma field, which is making 51 million cubic feet of gas daily. This gives it seven gas wells in that field with four oil wells. J. A. Read of Cedar Rapids, Iowa and J. J. Hall of Denver control the Oklahoma concern.

To Extend Illinois Power and Light Service

Development of the gas division of the Illinois Power & Light corporation during the forthcoming months will occupy engineers of that utility, E. S. Hight, assistant vice president in charge of operations and chief engineer, told stockholders at the recent annual meeting of the company.

Directors of the corporation were re-elected as follows: Clement Studebaker, Jr., president; George M. Studebaker, E. N. and Stephen E. Hurley, O. N. Custer, P. L. Smith, George T. Buckingham, J. E. Otis and H. L. Hanley. The East St Louis industrial area is now supplied through more than 150 miles of gas main, Mr. Hight reported, and this service will be rapidly extended.

Research Graduate Assistantships

To assist in the conduct of engineering research and to extend and strengthen the field of its graduate work in engineering, the University of Illinois maintains fourteen Research Graduate Assistantships in the Engineering Experiment Station. Two other such assistantships have been established under the patronage of the Illinois Gas Association. These assistantships, for each of which there is an annual stipend of $600 and freedom from all fees except the matriculation and diploma fees, are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics, or applied chemistry.

Pontiac Franchise Renewed

Franchise of the Public Service Co. of Northern Illinois for maintenance and operation of its gas plant and distributing system in Pontiac has been renewed for a 25-year period. Original petition was for a 50-year franchise but the council cut this to 25 years when it came up for final vote.

To Build Natural Gas Booster Station

To maintain a uniform gas pressure in the Amarillo-Denver natural gas pipe line, a booster station in the vicinity of Pueblo Colorado will likely be erected. The estimated cost is $600,000.

Personals

R. Z. Zimmermann was elected vice president of The United Gas Improvement Company in charge of purchasing on March 27th. He succeeds J. A. Pearson, who resigned after 40 years of service.

The new official is a half-brother of John E. Zimmermann, president of the U. G. I. He is 35 years old and has had wide experience in the public utility industry, having been connected with Day & Zimmermann, Inc., since November, 1916. He will assume his new duties at once.

R. Z. Zimmermann

R. Z. Zimmermann was born in Buenos Aires, Argentine Republic, in 1894. He was educated at Institute Libre de la Segunda Ensenanza, of that city, and at the University of Pennsylvania, from which he was graduated in mechanical engineering in 1916. That year he joined Day & Zimmermann, Inc., and with that organization has gained broad experience in the design, construction and management of gas, electric, electric interurban and street railway and bus line properties in Pennsylvania, Ohio, South Dakota and Nebraska.

In November, 1926, he was appointed assistant to the vice president in charge of public utility management of Day & Zimmermann, Inc., and has been associated with The United Gas Improvement Company since 1927, when a controlling interest in that firm was acquired by U. G. I.

In 1917, Mr. Zimmermann married Miss Maria Thayer Graham. They have three children and live at 24 E. Springfield Avenue, Chestnut Hill, Philadelphia.

Mr. Zimmermann is a member of the National Electric Light Association, American Electric Railway Association, St. Anthony Club of New York and Sunnybrook Golf Club, Philadelphia.

J. A. Pearson, vice president in charge of purchasing, The United Gas Improvement Company, has tendered his resignation effective April 1. Mr. Pearson has been in U. G. I. employ for forty years.

In making the announcement, John E. Zimmermann, president of the company, said:

"I regret to announce the resignation of Mr. J. A. Pearson, vice-president in charge of purchasing, effective April 1. Mr. Pearson's retirement is at his own suggestion and is in pursuance of a determination of several years to retire from business upon the completion of forty years of service with the company.

"Under Mr. Pearson's administration, the Purchasing Department of the U. G. I. has been brought to a very high standard and has acquired an enviable reputation in the public utility field."

Charles W. Person, for nine years secretary of the Publicity and Advertising Section of the American Gas Association, has resigned his position to become affiliated April 1, with the research organization of The Koppers Company, Pittsburgh, Pa.

Mr. Person joined the headquarters staff of the American Gas Association in November 1919 as the first secretary of the Publicity and Advertising Section. He inaugurated the first publicity and advertising services sponsored by the Association, and was active in organizing the committees on public utility information. He was one of the founders of the Public Utilities Advertising Association and for several years has been a director and treasurer of that organization.

Mr. Person is widely known in the gas industry and has many friends among the advertising men of the electric light and power, street railway and telephone industries. For the past two years he has devoted part time to the work of the Joint Committee on National Utility Associations.

On March 1, a testimonial dinner was tendered Mr. Person at the Engineers Club, New York.

Dr. Herbert A. Black, of Pueblo Colorado, owner of the Canon City Gas Company, Canon City, Colorado, recently sold the plant to the Smith-Landeryou Company of Omaha, February 26. The consideration was not given out.

The new company which will be under E. G. Jones as president and general manager will call in some outstanding bonds and offer the holders the privilege of exchanging the bonds for stocks of the new company.

Mr. Jones was formerly general manager of the Greeley Gas Company of Greeley, Colorado.

(*Continued on page 74*)

Running Circles Around Electric Range Competition

That is a sizable order, isn't it? But it is being done by Gas Utility Stores in localities where the Utility Management and Chambers District Sales Managers are really hitting their stride.

We have the formula for selling gas ranges so as to build prestige as well as business for the gas company,—so as to forestall the best efforts of the opposition.

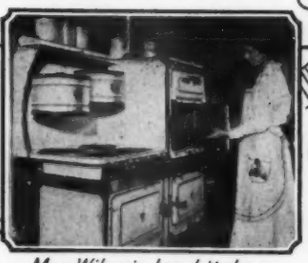
We manufacture the gas range that successfully meets electric competition and excels along the very lines of *their* strongest arguments.

We all know that your biggest task is to provide gas equipment so surpassingly fine and efficient that competition of other fuels will have no insurmountable allure.

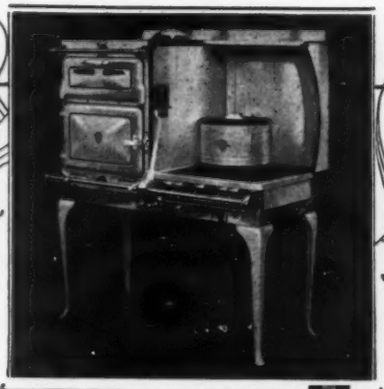
We also know that the electric industry is keenly alive to its opportunities and will run you a tough race. Their program is BIG and we admire them for their deep vision.

We admire them but we do not fear them.

All we seek is a chance to show you that together we can run those circles we spoke of, right in *your* locality.



Mrs. Wiley in her kitchen.



COOKS WITH THE GAS TURNED OFF

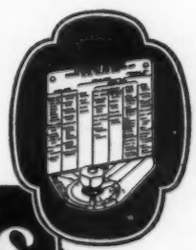
Grand Prize Paris 1928

Adding a whole month of leisure

In national magazines, we are telling the women of America that the Chambers Gas Range gives them two hours a day more leisure. We are telling them that the Chambers Gas Range is striking the shackles of kitchen slavery off their wrists. This range lives up to these claims and we are winning by pointing out a more intelligent use of gas and by suggesting improved cooking methods.

We are selling *the service* that our product renders and that is a much wiser thing to do than merely to exploit the product itself. The housewives of America want service and are willing to pay what it costs.

The Chambers Manufacturing Company
32 Columbus Park
Shelbyville, Indiana



We are merchandisers as well as manufacturers and that must be the status of the Gas Company also. Write us when you are ready to discuss this matter personally.

Chambers
AUTOSTAT GAS RANGE

Personals

(*Continued from page 72*)

F. F. Schauer, general manager of the Equitable Gas Company, as subsidiary of the Philadelphia Company, announces the inauguration of a system development department to have charge of all gas engineering, planning and research activities of the combined companies in Pittsburgh. E. P. Harston is the superintendent of the new department.

E. A. Wilder, who has been doing special housheating engineering work for the New Business Department of the Kansas City Gas Company since 1925, has been selected by Mr. Adams as the new manager of the Newton Gas Company. Mr. Wilder will replace Mr. L. L. Garner, who has been manager at Newton ever since this company was purchased by the Doherty organization, in 1925.

Mr. Wilder is an old organization man and has had a great deal of practical operation and engineering experience.

Mr. Wilder is a graduate of the University of Iowa, completing a course in mechanical engineering in that school in 1907.

Fred Karr has been elected General Manager of the St. Joseph, Mo., Gas Company, and will be located permanently in St. Joseph.

Mr. Karr, who has been acting as general manager since last September, who supervised the change over from artificial to natural gas on January 14, 1929.

L. D. Carner has been appointed Division Manager of the Customer Ownership Department for the New England group of the Associated Gas & Electric System. He will make his headquarters at the company's office at Cambridge, Mass.

Harry G. Lake, Superintendent at Mechanicsville, N. Y. has been promoted to Division Manager of the territory around and including Mechanicsville, Granville, Salem and Hudson Falls. Mr. Lake has been connected with the company since December, 1910, when it was known as the Half Moon Light Heat and Power Co. It is now part of the Associated Gas & Electric System.

Adam Gschwindt, general manager of the Rockford, Ill., Gas Light & Coke company and the Rockford Electric company, who has recently been seriously ill in the Rockford hospital, following an attack of acute indegestion, is recovering.

Viola Luhring will continue as local manager of the Waverly Gas Company, recently acquired by the Iowa Public Service company, which took over immediate operation of the plant and service, under supervision of the Waterloo district office. Headquarters of the new operating company are in Sioux City. No change in the local personnel has been made.

Geo. B. Cortelyou, President Consolidated Gas Co. of New York

George Bruce Cortelyou was elected President of the Consolidated Gas Company of New York twenty years ago, as of March 25th. Just three weeks before Mr. Cortelyou had laid down his portfolio as Secretary of the Treasury in President Theodore Roosevelt's cabinet when William Howard Taft succeeded Colonel Roosevelt to the Presidency. Mr. Cortelyou had previously held two other cabinet positions—Secretary of the Department of Commerce and Labor and that of Postmaster-General.

When Mr. Cortelyou was elected president of the Consolidated Gas Company he filled a vacancy that had existed since 1904 when Harrison E. Gawtry resigned the presidency to become chairman of the board of trustees. In the interim Mr. Walter R. Addicks, now Senior Vice-President of the company, had been acting president of the Consolidated Gas Company.

A remarkable growth in the financial and business structure of the Consolidated Gas Company is shown under Mr. Cortelyou's administration. In the annual report of 1909 which gave the operations for the previous year, the company's investment in land, plant and equipment was $243,881,950, as compared with $989,186,766 in 1928, the latter showing an increase of $745,304,816, or 306 per cent. The total assets on December 31 last were $1,080,740,446, as compared with $284,747,991 on December 31, 1908, an increase of $795,992,455, or 280 per cent. The company's gross revenues grew from $39,324,967 in 1908 to $212,594,530 in 1928, an increase of $173,269,563, or 441 per cent.

When Mr. Cortelyou became president in 1909 the total number of employes of the Consolidated Gas Company and its affiliated gas and electric companies was 10,448, as compared with 45,821 employes in 1928, an increase of 339 per cent. There are now 3,382,205 gas and electric meters installed for service, as compared with 857,170 in 1908, or an increase of 295 per cent. in the local territory of the gas and electric companies in the Consolidated Company's family.

R. M. Martin, Director of Display, Consolidated Gas Company of New York, is receiving congratulations on becoming the father of a daughter born on February fourteenth.

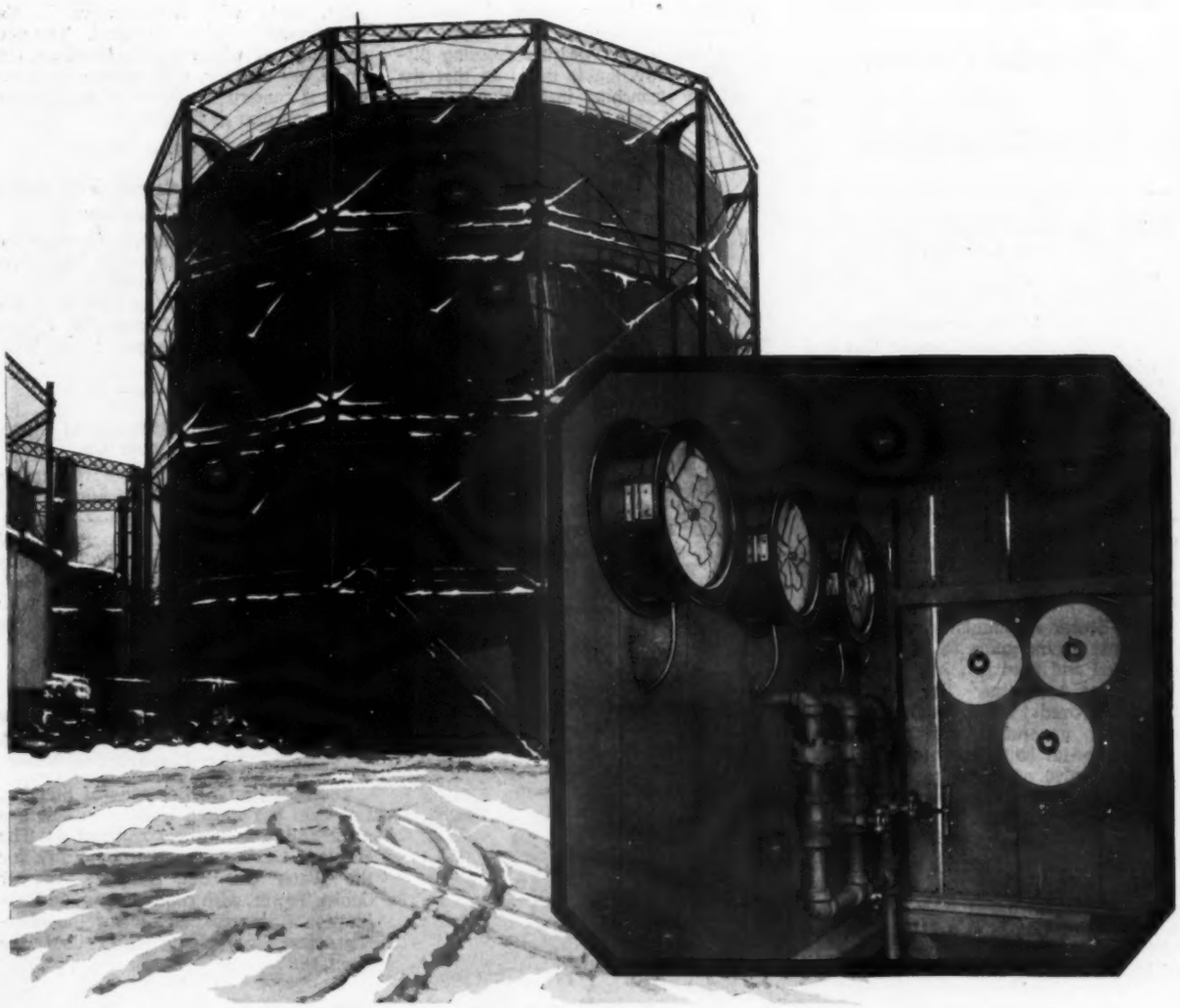
George H. Shaw, general counsel of the Public Service Company of Colorado, addressed the Denver Real Estate Exchange March 13, outlining the work his company is doing. Its annual pay roll is $3,750,000 per annum and new capital of $3,500,000 a year is added to meet the growing needs.

Two large buildings taking up two city blocks have just been completed to take care of equipment, and house together various departments that were badly scattered for the want of housing space.

H. C. Loeffler, who is in charge of an industrial survey of the city of Pueblo Colorado says that cheap fuel is one of the principal reasons for the city's growth and natural gas is mentioned for its value in particular industries.

Charles A. Keller, formerly connected with the Henry L. Doherty Company, has been appointed security sales manager for the W. B. Foshay Company, with his headquarters 302 United States National Bank building, Denver Colorado.

Earl A. Moseley, manager of the municipally owned gas plant of the city of Colorado Springs, states that he believes that the city will soon have natural gas service from the Colorado Interstate Gas Company.



Gas tanks mustn't freeze up!

THE water in which this gasometer floats must not be allowed to freeze. That is why three Brown Recording Thermometers keep check on the water temperature. Responsibility is definitely fixed, since the charts show if and when freezing temperatures were allowed to occur. Brown Thermometers have non-corrodible aluminum cases . . . an important feature for outdoor or semi-outdoor work. Write for data on instruments for gas plant service . . . thermometers, gauges, pyrometers, flow meters, liquid level gauges, draft gauges, $\%CO_2$ meters . . . indicating, recording, automatic signalling or automatic controlling.

THE BROWN INSTRUMENT COMPANY
4473 Wayne Avenue, Philadelphia, Pa.
Branches in 20 principal cities.

Brown Thermometers

"To measure is to economize"

Trade News and Construction

United Engineers and Constructors, Inc., Activities

The U. G. I. Contracting Company, division of United Engineers & Constructors, Inc., has been commissioned by Philadelphia Suburban-Counties Gas and Electric Company to furnish and install a 6" diam. high pressure, welded steel gas main from Langhorne, Pa., to Bristol, Pa. The work will be done by the Distribution Engineering Department of The U. G. I. Contracting Co.

Luzerne County Gas and Electric Corporation are having The U. G. I. Contracting Company, do considerable improving of the Nanticoke Gas Plant. The work will include the installation of a Smoot Steam Accumulator, so that exhaust steam now going to waste may be conserved and used in the Carburetted Water Gas Apparatus. The apparatus is to be improved by the installation of a new 6 ft. generator, with connections, new washer-tar batter, new take-off main, hydraulic valve operating system, including pumps, and the installation of a Chrisman Cycle.

The City Gas & Electric Development, through Semet-Solvay Engineering Corporation, has purchased from The U. G. I. Contracting Company, a U. G. I. Model "B" Automatic Control for the operation of its Carburetted Water Gas Apparatus

Opens Chicago Office

Hill, Hubbell & Co., division of General Paint Corporation, have established an office at 1639-1641 Bankers Building, 105 West Adams Street, Chicago, Illinois.

This office is made necessary by the increasing scope of the mechanical coating and wrapping plants now installed at various tube mills in the pipe producing areas.

Dry Quenching Equipment Corporation Erecting Plant in Flint

The Dry Quenching Equipment Corporation, New York, a subsidiary of International Combustion Engineering Corporation, will begin construction in conjunction with Stevens & Wood, Inc., at the Court Street Plant of the Consumers Power Company, Flint, Michigan, of a dry quenching plant to care for approximately 280 tons of coke per day. This installation will provide approximately 280,000 lb. of high pressure steam per day from heat now wasted through wet quenching—a better grade of domestic coke—reduced maintenance charges and will eliminate cold weather freezing difficulties. Provision is made so that the initial dry quenching installation may be extended to care for 500 tons of coke per day. This is the first dry quenching plant to be installed in Michigan.

Bailey Meter Co. Establishes Australian Branch

The Bailey Meter Company of Cleveland, Ohio, announces the formation of a subsidiary company, Bailey Meters (Aust.) Limited, with headquarters at Kembla Buildings, Margaret Street, Sydney, N. S. W., Australia. The new company, with Mr. C. W. Payn as Managing Director, will promote the sale of a complete line of metering equipment and automatic control for power plants, water works, and industrial concerns. They also announce the change of their Cincinnati, O., office to Union Central Bldg., with E. R. Dearborn in charge.

Cast Iron Pipe Makers Adopt Symbol

The symbol shown has been adopted as the trade mark of The Cast Iron Pipe Research Association. It will appear on all cast iron pipe made by the leading pipe founders, who are members of the Research Association.

The Alexander Milburn Company Elects New Officers

At the annual stockholders meeting, recently held at the Home Office of The Alexander Milburn Co., Baltimore, Md., Mr. E. P. Boyer was elected Vice-President.

Mr. Boyer became associated with the company in 1919 as its Philadelphia District Manager. In May, 1926, he established The Milburn Sales Co., handling the Philadelphia territory, and later the New York and Chicago Sales. Late in 1928 Mr. Boyer was also elected Vice-President of The Milburn Sales Corp., and The Milburn Paint Spray Corp., who are the distributors for all of the products of The Alexander Milburn Company.

Canadian Company Formed by United Engineers and Constructors, Inc.

Dwight P. Robinson, president, United Engineers & Constructors, Inc., Philadelphia, has announced the formation of United Engineers & Constructors (Canada), Ltd., with headquarters in the Drummond Building, Montreal. The new company, of which R. M. Henderson is managing director, will execute engineering and construction work of any character in any part of Canada.

Brown Instrument Company Appoints Two Vice-Presidents

The Brown Instrument Company announces the appointment of two Vice-Presidents as follows:

Charles H. Kerr, Vice-President and General Manager; George W. Keller, Vice-President and General Sales Manager.

Jones Made General Manager of Cleveland Trencher Co.

The Cleveland Trencher Company, Cleveland, Ohio, manufacturers of "Cleveland" Trenchers, announces the appointment of A. V. Jones as its general manager. Mr. Jones was until recently merchandise sales manager for the Buffalo General Electric Company, with whom he has been associated for the past twenty years.

Western Gas Construction Company to Erect Water Gas Set at Sterling, Colorado.—Other Construction News

The Sterling Gas Company of Sterling, Colorado has started work on a new gas plant and has awarded contract to The Western Gas Construction Company for the Water Gas Set, complete, Washer Cooler Tower, with cooling coils and Purification Apparatus, also all of the interconnecting gas piping throughout the plant.

The Kentucky Utilities Company of Shelbyville, Ken., has completed plans to build a new plant and has contracted for the necessary Gas Generating equipment, Holders, Purifiers, Oil Storage Tanks, Boiler and Gas Piping.

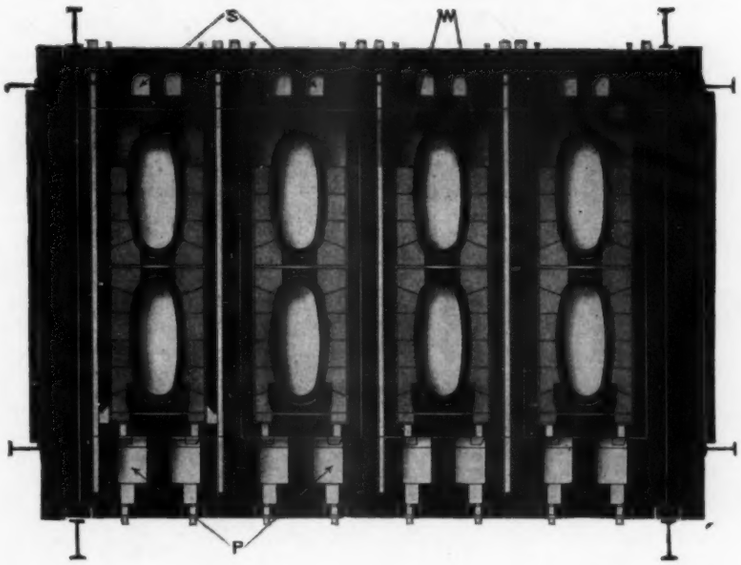
The Western Gas Construction Company is preparing to ship one of their Automatic Controls to Buenos Aires, South America. The contract for this control has been received through Davison and Partner Ltd., London, England.

The Central Maine Power Company of Augusta, Maine, is preparing to rebuild their plant at Waterville, Maine, and has placed the contract for the new Water Gas Set, Fuel Handling Equipment, Steel Purifiers, Exhauster, Meter, Washers and all Inter-Connecting Piping.

Contract has been awarded for a quantity of 20" pipe and fittings for the Key City Gas Company, Dubuque, Iowa, to take care of the alterations which they are planning to make at their plant.

(*Continued on page 78*)

GLOVER-WEST
Vertical Retorts



The Retort Setting is characterized by several other points peculiar to the Glover-West System. The admission of the secondary air to the combustion chambers by way of passages in the walls not only makes use of radiated (otherwise lost) heat but ensures the stability of the walls under maximum temperature conditions.

P = Producer gas uptake.
S = Secondary air uptake adjacent to
W = Internal Waste gas uptake.

All retorts are equally heated on both sides. Expansion is fully allowed for. Temperatures are under complete control.

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York

Trade News

(Continued from page 76)

The Peoples Gas Light and Coke Company of Chicago, Ill., has awarded contract for additional condensing equipment for their Division Street Station.

The Zenith Furnace Company of Duluth, Minnesota, are installing additional holder capacity at their plant and have awarded a contract to supply their requirements.

The Jersey Central Power and Light Company of Asbury Park, New Jersey has awarded a contract consisting of a Water Gas Set, Condenser and Tar Extractor. The new set is to be installed in a new building which will also be erected by this company.

The Steel Company of Canada is making a number of changes to their plant at Hamilton, Ontario, Canada, and has awarded a contract covering a large quantity of steel pipe, fittings and valves.

The Public Service Electric and Gas Company of New Jersey are installing at their Harrison plant an additional Absorber-Saturator for their liquid purification plant.

The Koppers Construction Company of Pittsburgh, Pa., has been awarded contract from the Wisconsin Gas and Electric Company for a liquid purification plant of the sulphur recovery Thylox process for their Racine, Wisconsin, plant. The capacity of the plant will be 10,000,000 cu. ft. per day and have an ultimate capacity of 15,000,000 cu. ft. per day. The design of this plant will be of the very latest high pressure thionizer type. This equipment represents the latest developments of the Koppers Company's Research Organization. New apparatus has been considerably simplified reducing both investment and operating expenses. The Western Gas Construction Company of Fort Wayne, Indiana, will build and erect this plant for the Koppers Construction Company.

There have recently been completed shipments of considerable new equipment for the Manila Gas Corporation, Manila, P. I., consisting of the very latest type water gas generating equipment, complete with auxiliaries, operating floors, automatic control, blast and gas piping, also Western cinder traps, or dust collectors. In addition to the materials required for complete generating equipment a large quantity of refractory materials and spares for all the apparatus furnished was included. With the completion of this installation the Manila Gas Works will have three Western Gas water gas sets, two previous installations having been made several years ago. Contract for the last equipment was placed by the Whetstone Engineering Company, Philadelphia, Pa.

Semet-Solvay Engineering Corporation to Install Multiple Washer in Reno

The Sierra Pacific Power Company, of Reno, Nev., has ordered a multiple washer which will be used to remove tar and napthalene from oil gas.

The Consumers Power Company has ordered for its Jackson, Mich., plant a 10′ Steere water gas machine, equipped with Backrun and mechanical rolling grates for removal of clinker. The new equipment for the plant includes apparatus necessary to cool and clean the increased output of gas. There will be a new washer cooler for scrubbing and condensing, with eight stocks of cooling coils A. P. & A Tar Extractor and a Multiple Washer are also to be added.

A quantity of welded steel and cast iron pipe is being installed in the gas plant of the Michigan Federated Utilities in Marshall. This work is part of a general remodeling program, which includes the installation of a new Steere Water Gas Machine.

The Jersey Central Power and Light Company has ordered a Backrun for a 5′ water gas machine. This will be the second Backrun to be installed in the Ocean City plant.

Northern New York Utilities, Inc., Troy, N. Y., has placed an order for trays sufficient for two round purifiers. These trays will be the new all-wood type, the boards being held together with wooden dowels instead of metal bolts.

The municipal gas plant at Sherbrooke, Que., is to be remodeled. The construction program includes the rebuilding of one water gas machine, equipping it with a Backrun and water sprays in the top of the superheater, for making Backrun steam from water. A tar separator and a new system of yard piping will also be installed.

Gas Machinery Company to Install Water Gas Set at La Salle—Other Contracts Received

The Illinois Power & Light Corporation have placed a contract for one 8′-0″ diameter carburetted water gas set to be installed in their plant at La Salle, Ill.

This water gas set will be equipped with the manufacturer's Cooler Gas connections with reversal valves located in the seal-separator, entirely out of the hot zone.

The apparatus is provided for hydraulic operation, manipulated from a hand hydraulic control nest.

For operating the hydraulic valves an enclosed pressure system will also be furnished, which consists of two steam driven pumps, one as a reserve.

A low pressure tank for receiving the discharge from the cylinders and a high pressure tank which, in operation, is provided with an air cushion to insure a practically constant water pressure for operating the hydraulically controlled valves, regardless of the peak demand.

The Illinois Power & Light Corporation have placed an order for the construction of a 5′-0″ carburetted water gas apparatus, to be installed in their plant at Cairo, Ill.

This set will be hand operated from the ground floor and is provided with the Cooler Gas connections with the reversal valves located in the seal-separator and is required to take care of the rapidly growing demand for gas from the Cairo plant.

The Cedar Rapids Gas Company, Cedar Rapids, Iowa, have placed an order for two six-unit interlocking hydraulic control nests.

These will be used in connection with water gas sets which are being converted from hand to complete hydraulic operation.

The Northern States Power Company, Fargo, N. D., have through the offices of the Byllesby Engineering & Management Corporation of Chicago, placed an order for a 6′-0″ carburetted water gas set, to take care of the rapidly increasing demands from that plant.

The new set will be installed in a building formerly used as a retort house, and in laying out the new equipment provision has been made for the addition of a second machine at a future date.

Gas Purifying Materials Co., Inc., Enlarging Plant

The Gas Purifying Materials Co., Inc., has recently purchased the 5 acre water front plot in Astoria, giving them additional working space for the manufacture of their product Iron Boring Oxide. The total working space now occupied by Providence and Long Island City yards is 15 acres. This large amount of yard space is essential for the manufacture of a thoroughly cured boring sponge. The material which was formerly made with a four months curing process has been improved by a six months curing process thereby effectively increasing the efficiency of the oxide.

With their two yards the company is now able to carry sufficient material in stock to meet any emergency call.

Exactly ten years ago, this company started business with a 50′ x 100′ plot or about ⅛ of an acre. Their business has expanded to such an extent that they require all of the 15 full acres now occupied.

When the company began operations in May, 1919, they adopted as their slogan "Let Us Help Solve Your Purifying Problems." Considering the increase in sales each year thereafter, the officers feel that they have lived up to their slogan and helped solve many such problems. The company has just completed its record year, 1928, by purifying 126,600,000,000 cubic feet of gas with G. P. M. Oxide.

The illustration below shows a length of Cast Iron Pipe being checked for accurate size and hammer tested by plant inspectors.

THE manufacture of cast iron pipe, as practiced today in our modern foundries, might be a revelation to many engineers and contractors. The ancient, picturesque equipment and methods of yesterday have given place to modern machinery and accurate technical control. Today, the most modern machines of the electrical and mechanical engineer are utilized and every process in the production of cast iron pipe is submitted to minute inspection. From the cupola until the finished pipe is loaded on cars, watchful metallurgists are constantly guarding the quality of cast iron pipe.

* * *

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Pipe bearing the Association "Q-Check" mark may be obtained from the following: American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Cast Iron Pipe & Foundry Company, Burlington, N.J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

The symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association. Insist on this "Q-check" mark when specifying cast iron pipe for gas, water, sewer, or industrial service. For complete information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago.

CAST IRON PIPE

Trade News

(*Continued from page 78*)

Cooper and Bessemer Combine

A new company, The Cooper-Bessemer Corporation, representing a combination of The C. & G. Cooper Company, and The Bessemer Gas Engine Company, was announced last week. E. J. Fithian, President of The Bessemer Gas Engine Company will be Chairman of the Board and B. B. Williams, President of The C. & G Cooper Company, will be President and General Manager of the new corporation. The remaining officers will be chosen from the active executives of both companies.

There will be practically no change in the personnel of the sales and service organizations. In many cases the men have spent years of service and are considered specialists in their line by the trade which they have served so long. It will not be the policy of the combined organizations to effect any economies by reducing the sale and service forces. Rather they will be increased at some points with the idea of offering the trade still better service.

This combination brings together two of the oldest manufacturers of power machinery in the country. The C. & G. Cooper Company was established ninety-six years ago at Mt. Vernon, Ohio, by two Cooper brothers and has had an unbroken but conservative growth ever since.

The Bessemer Gas Engine Company was organized at Grove City, Pennsylvania, more than thirty years ago. Its progressive policies have resulted in a rapid yet sound growth until today Bessemer gas and diesel engines are favorably known in every industry where internal combustion engines are used.

You are advised to address all correspondence to the different field offices or to the two home offices and to the same individuals as you have been doing in the past.

Consolidation Coal Company Appointments

Effective April 1st, 1929, the Consolidation Coal Company announces the appointment of J. C. Shaw to be Assistant Manager of the Portsmouth, N. H., office. Mr. J. D. Woodson will continue as manager.

Barene Associated with Richmond Radiator Company

Otis E. Barene, who for the last five years or more has been connected with the gas industry in the capacity of sales engineer, developing house heating and industrial sales, is now associated with the Richmond Radiator Company, 1480 Broadway, New York City. He is engaged in the sale and distribution of the Heato mat gas fired boiler, one of the products of the company.

Otis E. Barene

Behar Appointed Advertising Manager

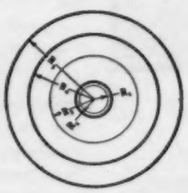
Capt. M. F. Behar has been appointed Advertising Manager of the Quigley Furnace Specialties Company, 26 Cortlandt St., New York. Mr. Behar was for several years advertising manager of the C. J. Tagliahue Manufacturing Co.

Cunningham Made Newark Manager for Humphrey Company

L. C. Cunningham has been appointed manager of the Newark Branch of the Humphrey Company, Kalamazoo, Mich., manufacturers of a complete line of gas water heaters.

New Laboratory Approval Seal

American Gas Association has recently sent out to its company members a full description of the new Laboratory Seal and recommendations as to its use and exploitation. The use of this seal is desirable at the earliest practical date and has been made mandatory after January 1, 1930.



Where the new seal is used in connection with any advertising or publicity material, it must be accompanied by a descriptive legend reading as follows:

"This Laboratory Approval Seal is a guarantee of compliance with basic national requirements for safety."

In addition to the above ruling, new applications for test blanks have been prepared to be executed by manufacturers submitting additional appliances for test, which will require those making application, to agree not to exploit the Laboratory Approval Seal in any other manner than that indicated above.

It has been further recommended that the manufacturers of approved gas appliances constitute themselves a vigilance committee to check the use and exploitation of the seal by manufacturers, dealers, or gas companies. Where infractions of the above policies are noted, the American Gas Association's headquarters should be notified and action will be taken to remedy any infractions of these rules.

A descriptive lecture giving the meaning of the Laboratory Approval Seal was published in the March issue of the A. G. A. Monthly. It is suggested that all members of the industry, particularly those that come in contact with the public as appliance salesmen, fully acquaint themselves with this article. Copies can be had upon request to American Gas Association.

The specifications on the Seal follow:

The five-pointed star in the Laboratory Approval Seal is light blue in color, all other parts of the symbol being in black on a background other than blue or black.

R_1 is the radius of the inner imaginary circle in which the monogram *Gas* is constructed; R_2, that of the circle inscribed within the star and about the monogram; R_3, that of the imaginary circle forming the base of the word *American* and the top of the word *Association;* R_4, that of the circle passing through the points of the star; and R_5, is the radius of the outer circle. The height of all lettering except that in the monogram is equal to the radius R_1. The parts of the seal described bear the following relations to each other:

$R_1 : R_2 : R_3 : R_4 : R_5 : 6 : 16 : 24 : 32.$

The minimum size of the seal for use on all gas appliances is one inch in overall dimensions, or, in other words, R_5 must be not less than one-half inch.

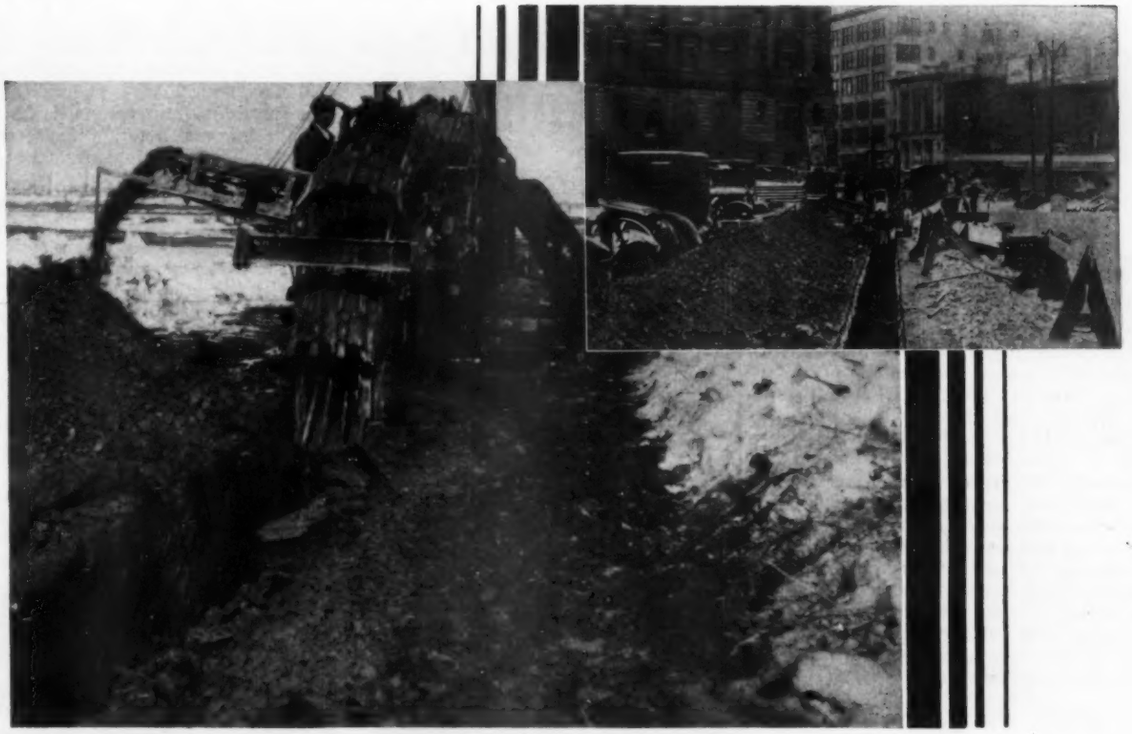
The approval seal is copyrighted and must be constructed exactly in accordance with the design, color, and proportions shown above.

A.G.A. Rate List Available

The American Gas Association has announced the publication of Rate List Number 7, the only complete and authoritative compilation of gas rates in the United States.

Natural and manufactured gas rates for the United States, the U. S. Possessions, Canada, Newfoundland, and Cuba are included.

The rate list is now available.



4 feet per minute through hard frost on this pipe line job

THE CLEVELAND BABY DIGGER

Gives you all the advantages of Machine digging plus maximum "usability"

The Cleveland Baby Digger is built to perform the hardest digging jobs with ease, speed and profit. It has abundant power, absolute dependability, maximum mobility and unrivaled economy of operation.

Because it is by far the most compact trencher available, the Baby Digger operates easily and efficiently in the most limited working space as well as in the open. It gives you all the economies of machine trenching on more than 90% of your jobs, in locations where otherwise expensive hand labor would be necessary.

This extreme "usability" of the Baby Digger is but one of the many distinctive features that have convinced gas companies in all parts of the country that it is the machine for the job. Write today for full information.

THE CLEVELAND TRENCHER CO.
"Pioneers of the Small Trencher"
20100 St. Clair Avenue - - - - - Cleveland, Ohio

THE BABY DIGGER

Cope Tackles Increased Gas Consumption Problem of Illinois Gas Association Convention

AN exposition of exhibits used by utility companies in their public relations and sales promotional activities and proofs of printed and publication advertising material featured the twenty-fifth annual convention of the Illinois Gas association, held jointly with the Illinois State Electric and Illinois Electric Railways associations at Springfield, Ill., March 14 and 15.

Although the display of working models, appliances, lighting effects, miscellaneous exhibits, maps, charts and printed matter was designed originally for mutual interchange of knowledge and ideas among utility delegates, the exhibition hall was opened to the public, after having been given wide publicity, and was visited by thousands from Springfield and neighboring communities.

Lungren Elected President

E. E. Lungren, Assistant General Manager, Western United Corporation, Aurora, was elected president of the Illinois Gas association, succeeding J. A. Strawn, Central Illinois Light company, Peoria. H. T. East, Assistant to the Vice President, Public Service Company of Northern Illinois, was elected vice president. J. A. Strawn, Peoria; E. D. Alexander, Sterling; B. J. Mullaney, Chicago; and M. L. Harry, Decatur, were elected directors. George W. Schwaner, Springfield, who had been appointed Secretary-Treasurer of the three associations to fill the vacancy created by the death of R. V. Prather, October 7, 1928, was elected to succeed himself.

The general joint morning sessions were addressed by leading public, industrial and public utility officials. They were: Louis L. Emerson, Governor of Illinois; Alexander Forward, Managing Director, American Gas association; Paul S. Clapp, Managing Director, National Electric Light association; J. W. Welsh, General Secretary, American Electric Railway association; John F. Gilchrist, Chairman, Illinois Committee on Public Utility Information; Hal M. Lytle, Chairman, Public Service Speakers Bureau (of Illinois); J. Emil Smith, Mayor, Springfield, Ill.; Dr. Frederick Besley, Chairman, College Board of Industrial Surgery, American College of Surgeons; and James D. Cunningham, President, Illinois Manufacturers association.

Gov. Emerson, who has just recently been elected, expressed his confidence in the sincerity of present public utility management both in Illinois and throughout the country. The greatest development of the public utility industry has come simultaneously with a sympathetic attitude by utility managers toward state regulation, he believes. Referring to former harassment of utilities by the public, he declared that it was not until the establishment of regulation that an understanding began to grow between the utilities and the public.

E. E. Lungren
President, Illinois Gas Assn.

"The utilities," he stated, "which were at first unfriendly to regulation, now find that it is the greatest stabilizing influence in their business. While it prevents their charging exorbitant rates or making excessive earnings, it guarantees a fair and reasonable return on investment and encourages extensions of service and improvement in plant and equipment. The people on their part have learned the economic lesson that no utility can give good service unless it can show a stability of value and an earning power that will attract capital.

'Regulation, therefore, is constantly drawing the public and the utilities closer together and paving the way for the sort of co-operation which will be to the greatest advantage of both. Anything which tends to destroy confidence in regulatory bodies menaces this movement."

There is a better understanding of these facts now than ever before, in his opinion. He gave this as the reason for less friction between utilities and their public and said, "You cannot give good service if your public is constantly hampering you with restrictions which prevent development and if you do not give good service you cannot have good will."

The governor advised the utility industries that they will continue to succeed only to the extent to which they maintain this policy and keep faith with the public. "No aggregation of publicity men and no political wire pulling can save you from disastrous results if the people get the impression that you are misrepresenting facts or trying to take unfair advantage," he warned.

The only successful public ownership of public utilities that the Illinois governor can see, according to his statements, is public ownership through the purchase of utility securities.

Maj. Alexander Forward, the only "gas man" to address the joint sessions of the three utility associations, talked on "What an Industry Must Do." The gas industry must keep its facts, straight, he said—facts on costs, sales and markets—and be able to interpret them intelligently to meet increasing competition.

He also expressed a need for research, saying, "It is indisputable that the industries which are in our day showing the greatest success in earning profits and in serving their public are those which show the greatest interest in and support of research undertakings. If there is one thing more than another that impresses me about the gas industry it is the stimulation of the spirit of research within the past year or two." About 70 separate research problems, sponsored directly by the association, are under way, he said.

James D. Cunningham, President of the Illinois Manufacturers association, attributed American industrial progress to public utility development. As to the future of public utility rates, he declared that economic law will continue to be the ratemaker, irrespective of commissions, since utility managers have learned that high rates slow down sales while low rates stimulate and enlarge the field of activity.

At the gas association sessions, F. P. Cope, Allied Power and Light corporation, Jackson, Mich., spoke on what he claimed should be the greatest effort of the gas industry, "Increasing Gas Sales Per Meter."

Industry Has Benefitted

He said, "The industry has undoubtedly benefited by the gradual increase of domestic customers, and with the extension of service to the smaller communities a continuance of this increase may be expected for the next few years, but that is not the problem that exists at present. The greatest efforts that are now needed are to make the average customer a better customer." This method of increase, he stated, should have a strong appeal since it does not involve increased investment in distribution facilities.

He referred to the intensive merchandising efforts being put forth by all industries resulting in spirited competition for the public's dollar and recommended wide use of long-time payments and carefully selected and trained sales personnel. "Regardless of the quality of our product, volume sales can be obtained only by a sales force of men who are trained as

This Pipe Will Reduce Operating Costs

It has already been shown how the high pressure capacities of Pittsburgh Seamless steel line pipe make possible the elimination of excess pumping stations. It has also been shown how the smooth, tough grain structure of this scale free line pipe, coupled with its high pressure capacities, tends greatly to reduce corrosion. ¶ In addition to these economies, by making rapid deliveries Pittsburgh Seamless line pipe will release tied up capital quicker than ever was possible with low pressure pipe. Pittsburgh Seamless will soon pay for itself in direct operating savings alone.

Pittsburgh Seamless *Is Safe*

Pittsburgh Steel Products Co.

DIVISION OF

Pittsburgh Steel Co.

PITTSBURGH NEW YORK DETROIT CHICAGO HOUSTON TULSA

Largest Manufacturers of Seamless Steel Pipe and Tubing Exclusively

Cope Tackles Problem

(*Continued from page 82*)

specialists and who have been properly educated on merchandising methods," he declared.

This is only one of the steps in the right direction, however, according to Mr. Cope's views, and he maintained that the next logical procedure is the selection of the type of appliance to concentrate upon to best bring about the desired results. He recommended the gas water heater and said:

"With the average consumption of a water heater amounting to 30,000 cubic feet per year, it is apparent that the sale of a water heater is equivalent to a new customer on the lines. A new customer added to the lines as an extension would cost approximately $100. Therefore, in the sale of 12,000 water heaters (which his company has sold in a three-year campaign) we have added to the lines without cost new business that through line extensions would have cost $1,200,000."

Intensifying Sales Efforts

He described the methods by which the Allied Power and Light corporation proceeded to intensify its sales efforts on this one appliance, and stated that satisfactory results were expected only with a storage water heater that could be sold at a moderate price, that would give adequate storage capacity and operate at a reasonable cost. The heater selected is of the continuous storage type and is built in two sizes, thirty and fifty gallons. The former has a maximum burner consumption of eight cubic feet per hour. It is heavily constructed, thoroughly insulated and meets the requirements of the average family, in Mr. Cope's opinion. He reported that the selling price of this heater is $75 and the fifty-gallon size, which is identical in construction, sells for $125.

He asserted that his company abandoned periodic selling campaigns and seasonal advertising, making water heater sales activity an all-year-round effort. The use of district men selling water heaters and other appliances was abandoned some time ago, Mr. Cope declared, because salesmen, despite every effort to counteract it, will specialize on the appliance that is easiest to sell and brings the greatest remuneration.

"In addition," he added, "customers have not the same confidence in the statements of a salesman who is selling a number of articles as they have in one who is specializing on one particular appliance, and a certain amount of prestige accrues to the salesman who is introduced as a specialist. We, therefore, decided on the specialist plan of selling, using a supervisor and crew wherever a district was sufficiently large to maintain a minimum of three salesmen."

By specializing in water heater selling, Mr. Cope said, his company increased the average sale of gas per domestic customer in all properties from 27,300 cubic feet in 1925 to 27,700 in 1926, 28,100 in 1927 and 28,400 in 1928, an increase in three years of 1,100 cubic feet.

A. G. Ford, Western United Corporation, Aurora, Ill., speaking on "Increasing Distribution System Capacities," said that in many instances the capacities of gas distribution systems are not being used to the greatest possible extent. By conversion of low pressure systems to medium or high pressures, using individual house governors, the capacities may be increased as much as ten times, thereby greatly reducing future distribution system investment, he advised.

Dr. D. B. Keyes, University of Illinois, reported on both the research work and training of technicians for the gas industry at the university. His report indicated that the Illinois state university is fully recognizing the need for furnishing college trained men for the gas industry and appreciates the wide field of gas research.

J. R. Pershall, Public Service Company of Northern Illinois, addressed himself to the engineering men of the gas industry and asked that they defer judging the mechanics of gas company advertising from the standpoint of an exact science until advertising becomes as scientifically accurate as their own profession. He believes that that time will come—the time when there will be set formulas for advertising so that results can be forecast accurately; when a certain kind of advertising will produce certain results and when a definite expenditure will bring a definite return.

That time has not arrived, however, Mr. Pershall said, because the profession is still in its formative stages. He asked that technical men be satisfied with present varying results and refrain from applying slide-rule methods to the ventures of their advertising departments.

The need for intensive and systematic employee training was emphasized by F. M. Dee, Jr., Business Research Corporation, Chicago. "If we want to secure excellence of performance on the part of employes, we should not expect it to appear spontaneously," he said. "It, like loyalty, must be earned, and to attain it we must provide the means for its fullest development."

Gas Sessions Group, Oklahoma Utilities Assn. Convention

Oklahoma Utilities Association Holds Successful Convention

THOS. R. WEYMOUTH, president of the Oklahoma Natural Gas Corporation, Tulsa, formerly of Buffalo, N. Y., was elected president of the Oklahoma Utilities Association at the eleventh annual convention at Oklahoma City, March 14. The convention was a three-day meeting closing with the election of officers. The new president is one of the outstanding gas engineers of the country and a leading authority on technical problems affecting the gas industry.

The 1929 convention of the Oklahoma association was the largest in its history, registration closely approaching 1,100 persons. At the annual banquet, held on the night of the 13th, nearly 600 plates were served. The banquet speaker was Col. Oscar H. Fogg, of New York, vice-president of the Consolidated Gas Company and president of the American Gas Association. A feature of the banquet was the presentation, by Col. Fogg, of a McCarter medal for life-saving to J. W. Campbell and A. G. A. certificates to Mr. Campbell and to J. S. Henderson, both men being employes of the Oklahoma Gas & Electric Company in its Enid or Northern division.

The Oklahoma Association is one of the leading public utility associations of the country, embracing all branches of the industry. It has divisions devoted to problems of electricity, gas, electric rail-

(*Continued on page 86*)

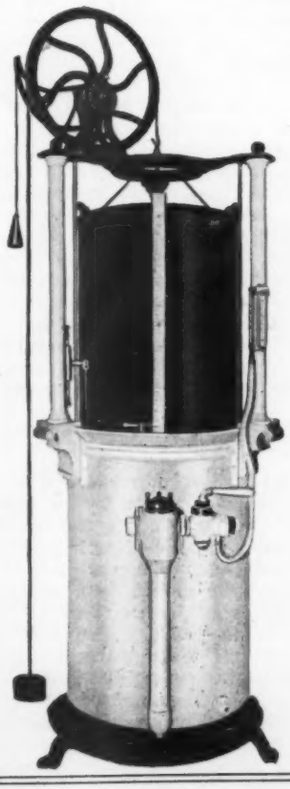
SUPERIOR

Gas Meters

Provers

Service Cleaners

Diaphragms



SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

The Brains That "Hook 'er" Are the Same Sort of Brains That Make Other Wise Decisions

And that is the reason the Ridgway Elevator-Using plants **Are All Moneymakers.**

Of course, such a common-place affair as a freight elevator is not a thing usually necessary to make much difference in profits—

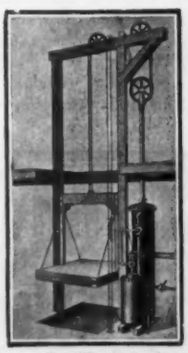
Unless it is one of the sort that is out of order much of the time.

If a man has steam, he shows his Good Business Sense and his skill in management by going to his typist and dictating:

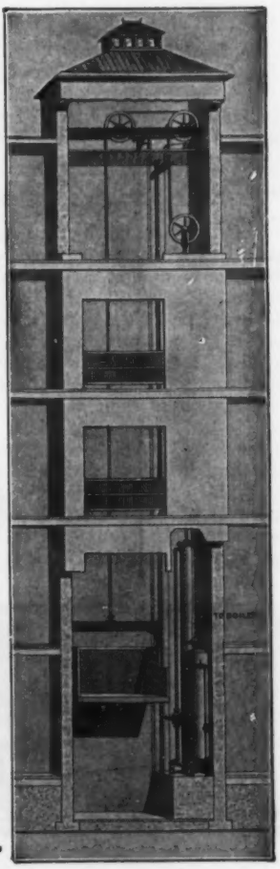
Dear Ridgway: Come at once, I want to

"HOOK 'ER TO THE BILER"

Direct Acting



Double Geared



CRAIG RIDGWAY & SON CO.
COATESVILLE, PA.

Elevator Makers to Folks Who Know — Over 3000 in Daily Use

Oklahoma Utilities Assn. Convention

(*Continued from page 84*)

ways, telephone, manufacturers and suppliers, and public relations, and this year effected the organization of a safety section. Special division programs for all the divisions mentioned are held during the afternoons of the convention period, with general programs occupying the mornings.

Features of the convention of special interest to the gas fraternity were many, and interest was keen throughout the three days. Papers presented, which concerned the gas industry directly, included the following:

"Financing Public Utilities," by Martin J. Insull, Chicago, president, Middle West Utilities Company.

"Regulation," by H. J. Haganah, Chicago, vice-president and general counsel, Byllesby Engineering & Management Corporation.

"Main Line Domestic Meters," A. J. Kerr, Tulsa, Dist. Mgr., Pittsburgh Equitable Meter Company.

"Gas Company Advertising," Reed S. McBeth, Tulsa, Director Public Relations, Oklahoma Natural Gas Corporation.

"A. G. A. Accounting Section Activities," Fred Karr, Kansas City, Director Public Relations, Gas Service Company.

"Results of Sales Activities in Natural Gas Utilities," F. M. Rosenkrans, Kansas City, New Business Manager, Gas Service Company.

"Developments in Gas Refrigeration," J. W. Duvall, Oklahoma City, Gas Engineer, Oklahoma Natural Gas Corporation.

"Relation of Barometric Conditions to Natural Gas Density," R. H. Locke, Ch.E., Oklahoma City, president Chemical Service Corporation.

Joullian Elected Chairman

E. C. Joullian, Oklahoma City, Consolidated Gas Utilities Company, was elected chairman of the gas division of the Association. This division has charge of all gas activities of the organization between and at the annual conventions. A major activity of this division each year is the Southwestern Gas Metermen's Short Course, held at the Oklahoma State University at Norman, 18 miles south of Oklahoma City, which was announced and explained in full at the recent convention by F. D. Frank, Bartlesville, Oklahoma, chairman of the gas meter shoot course committee. The course is to be offered this year on April 16-18. It is sponsored by the College of Engineering of the Oklahoma University, the Corporation Commission of Oklahoma and the Oklahoma Utilities Association. Last year's registration exceeded 300. Chairman Frank explained at a gas division meeting at the convention that this year's course is expected to exceed last year's in registration substantially, because the scope of the project has been expanded this year to include the wet gas industry, which has not been included heretofore.

Another major activity of the gas division is a gas conservation school, established in 1926 at Bartlesville, devoted to the study of conservation of natural gas from the mouth of the well to the burner tip. The 1929 school probably will be held at Bartlesville in August or September, according to announcement.

Fogg Addresses Meeting

In his banquet address on March 13 Col. Fogg discussed "Public Utilities and Publicity." He referred to the federal investigation which has been in progress for the past year, calling attention to the fact that the utilities have not yet had opportunity to present their side of the case as to publicity and information methods, and declaring that it is the duty of the industry to see that in its relations with the press constant appreciation be had of the "Canons of Journalism" as described at the Atlantic City convention of the A. G. A. by Walter Harrison of Oklahoma City, president of the American Society of Newspaper Editors, and to never violate or disregard these ethical concepts. He quoted Hon. George B. Cortelyou's Atlantic City statement, which he said Mr. Cortelyou had reaffirmed to him on the past few days, that "whenever an investigation of utility affairs discloses the existence of practices that are at variance with the spirit of American institutions, the industry will be the first to condemn them and to demand their suppression." And, further: "The Joint Committee holds no brief for any individual or company whose acts do not square with this standard, and in stating its position in this regard it is convinced that it represents the aims and purposes of the utility industry."

While the annual meeting-place for the convention is determined by the executive committee each year, usually in the summer, the plan of alternating Oklahoma City and Tulsa as the convention city is generally regarded as established, which would indicate that the 1930 convention will be in the "oil capital of the world." The by-laws of the Association fix the second week in March each year as the time.

T. H. Steffens, Sand Springs, Okla., president of the Sand Springs Railway, was elected first vice-president; S. L. McElhoes, Oklahoma City, vice-president of the Southwestern Light & Power Company, second vice-president; W. R. Emerson, Oklahoma City, secretary-treasurer of the Oklahoma Gas & Electric Company, treasurer, and Edward F. McKay, Oklahome City, for the past six years manager of the association, to succeed himself in that office.

Invites Gas Men to Suggest Names for C. A. Munroe Award

Every member of the American Gas Association is invited to submit names to the Association's Executive Board for the Charles A. Munroe Award for outstanding service performed during the year July 1, 1928, to June 30, 1929, according to announcement just made by Association Headquarters in New York.

This invitation to present suitable names is extended to the Association's company and individual members, every officer and director and all chairmen and members of all general and sectional Association committees.

The award will be made annually without lapse, and it is hoped to make the first presentation at the association's eleventh annual convention and exhibition at Atlantic City, N. J., October 14-18, 1929.

The Charles A. Munroe Award provides annually for the financial recognition of any individual who, in the opinion of the Association's Executive Board, has made the most outstanding contribution during the year in the general interests of the gas industry.

Mr. Munroe, a former president of the association and long and prominently identified with the gas industry, has donated $10,000 as the capital sum of the award fund.

Under the provisions of the award, the most outstanding contribution to the general interests of the gas industry may be presumed to include the following: research, invention, operating methods or practices which reduce cost of manufacture and distribution, improved distribution or other service, increased sale of gas, development of new uses for gas, improved public and employee relations, promotion of safety, development of improved acounting practices, widening the field of gas making materials, new methods of manufacture, finance, publicity, etc.

Improved Equipment · Russell Engineering
HORIZONTAL GAS OVENS. COAL GAS PLANTS. BENCHES—STOP ENDS & THROUGHS.
NEW YORK · Corporation · CHICAGO
REFILLINGS. ADDITIONS. REPAIRS. IMPROVEMENTS. EXTENSIONS. APPARATUS

Standardize on Mueller Stops

Mueller G 11007 Flat head service Stops

Mueller G 11026 Flat head service Stops

An installation of Mueller Gas stops — either brass or iron body with brass keys —will convince you of their service giving dependability.

Standardize on Mueller gas stops now as hundreds of others have done and eliminate costly service failures.

Mueller Laboratory control of materials from raw metal to finished product reinforced by careful workmanship, systematic inspection and our more than 70 years knowledge of gas service needs enables us to produce a quality of stops satisfying your requirements.

Our complete catalog of gas and water service goods sent you on request. Estimates willingly given on your 1929 needs.

MUELLER CO. *(Established 1857)* **Decatur, Illinois**
Branches: **New York, Dallas, San Francisco, Los Angeles**
Canadian Factory: **MUELLER, Limited, Sarnia**

MUELLER

"INDUGAS"

VERTICAL CHAMBER OVEN

With Water-sealed Drop Door

INTERMITTENT TYPE

Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason

Full information, layouts and estimates gladly furnished

INDUGAS COMPANY, INC.

114 LIBERTY STREET, NEW YORK

Exhibition Spaces
305, 306, 307, 308

At the Annual Meeting of the Natural Gas Department, American Gas Association, Kansas City, Missouri, May 6-9. SMITHWelded Products will be exhibited in Exhibition Spaces 305, 306, 307, 308.

Starting

on September 15, 1927, with a first shipment of four trainloads, SMITH-Welded Line Pipe has swept the oil and gas fields with an unprecedented wave of acceptance. In the eighteen months intervening, orders have been received totaling approximately 2,500 miles of Oil and Gas Line Pipe varying in sizes from 8 inches to 24 inches.

A. O. SMITH CORPORATION
Oil & Gas Field Products Division

General Offices:
Milwaukee, Wisconsin

District Offices at
New York · Pittsburgh · Tulsa
Houston · Los Angeles

THE WAVE OF ACCEPTANCE

SMITHWelded Line Pipe has been used or is now on order for the following lines:

Dixie Gulf Gas Line . . . 280 miles of 16, 18 and 22 inch pipe . . . 40,725 tons.

Magnolia Gas Line . . . 160 miles of 16, 18 and 20 inch pipe . . . 15,500 tons

Texas-Empire Line . . . 636 miles of 12 inch pipe . . . 70,000 tons.

Roxana Line . . . 100 miles of 10 inch pipe . . . 8,500 tons.

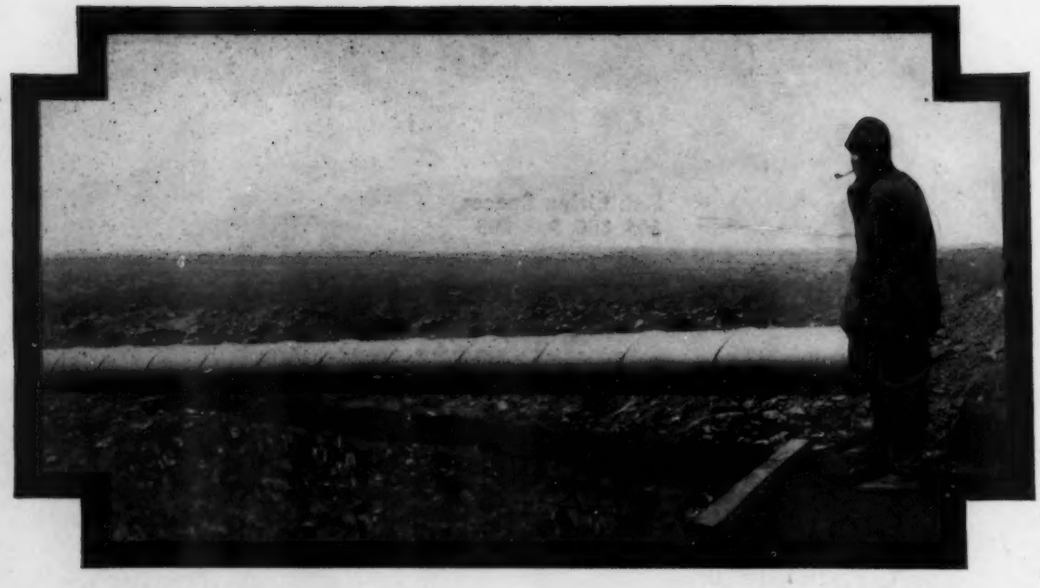
El Paso Natural Gas Line . . . 205 miles of 16 inch pipe . . . 23,000 tons.

Western Public Service Line . . . 287 miles of 14, 16 and 18 inch pipe . . . 33,000 tons.

Pacific Gas & Electric Co. . . . 237 miles of 16, 20 and 22 inch pipe . . . 35,000 tons.

And other shorter lines

SMITHWELDED LINE PIPE



The Strongest Pipe Per Lb. of Weight

"FOR standard pressure pipe, Naylor Pipe unquestionably has the strongest structure per lb. of weight."

This is the statement of one of the greatest line pipe experts in the country.

Because Naylor Pipe has this unusual structure it only weighs about half as much as standard weight wrought pipe.

Reduced to practical results this means a reduction of approximately 30% in erection costs.

Moreover, since Naylor Pipe is made of Toncan Iron, it will resist corrosion far better than will ordinary pipe.

The Copper and Molybdenum in Toncan Iron greatly increase the corrosion-resistance of the refined iron.

Naylor Pipe saves twice—in erecting costs and in maintenance expense.

NAYLOR PIPE COMPANY

Main Office and Plant, 1230 East 92nd Street, Chicago

Sales Offices:

New York	Philadelphia	Cleveland	Detroit
25 Church Street	Witherspoon Building	1367 East 6th Street	1500 Cadillac Square Building

Tulsa, 507 Philtower Building

DUCOMMUN CORPORATION

Los Angeles San Francisco

Exclusive Distributors: California, Arizona, Nevada, and Utah

Montreal, Canada—Mechanical Equipment Company, New Birks Building

TONCAN

Naylor Pipe

Mo-lyb-den-um

IRON

Standardized Naylor Pipe is made in sizes 6" to 12" in standard 20 ft. lengths or special lengths up to 40 ft. Made with 5 types of pipe ends to wrought pipe standards for 5 types of joints.

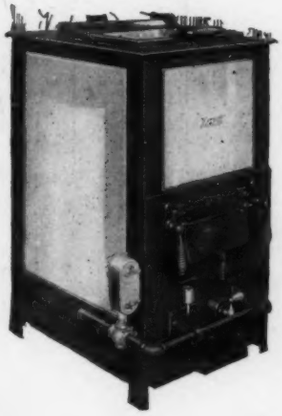
Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

Kernit

REG. U.S. PAT. OFF.

GAS-FIRED INCINERATOR

The Kernit is now made in green finish with grey enamel panels and nickel trim; which color combination makes an unusual and attractive appearance.



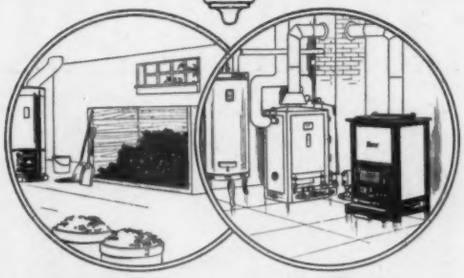
The Kernit is a custom-made, gas-fired incinerator—tested and approved by leading gas company laboratories.

Made in two sizes—3 and 4 bushel capacities.

Kernit sales literature available to gas companies consists of special folder for architects and builders, booklets and mailing folders for the home owner, and display posters and show room cards, also a four page, letter-size, illustrated mailing broadside.

SANITATION BY INCINERATION

Smoky and pot cast and dogs are quite apt to carry disease germs to the children and adults.



BEFORE
Accumulation of rubbish in the basement creates a fire hazard and a breeding spot for all sorts of vermin.

AFTER
The modern sanitary basement, equipped with a Kernit incinerator, as a convenience to housekeeping and a safeguard to health.

Necessity for carrying table waste and rubbish outdoors, in cold or inclement weather, often causes colds and other ailments.

The *KERNIT* is easily installed in your basement, generally near the house chimney. Just lift the lid and drop in garbage, papers, dead flowers, old rags, sweepings—anything combustible. After two or three days sufficient garbage and waste will have accumulated for burning. The moist material having partially dried out will then burn quite readily and without smoke or odor. That will be the last of it. Nothing left but a little ash.

Operation is quite simple as the burner is lighted from a pilot lighter. Simply press the button to start the burning. A time clock controlled device turns off the gas at the completion of the burning period. This valuable feature means there is no danger of forgetting that the incinerator has been lighted. The gas is shut off positively and automatically, thus avoiding any waste of fuel. Cost of operation is but a few cents a day.

The servant problem is simplified by elimination of the unpleasant and obnoxious features connected with the handling of garbage and waste.

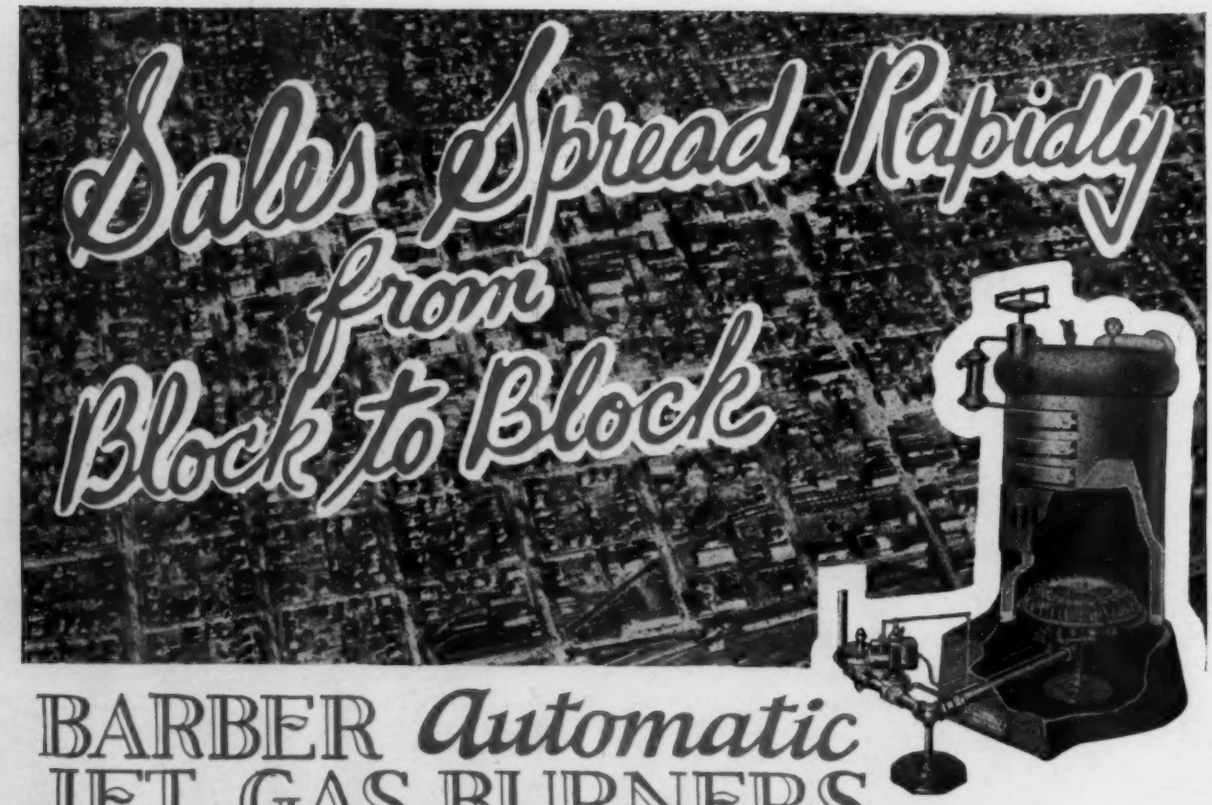
Disease germs cause sickness. The garbage pail is a breeding spot for flies. These convey to us numerous dread disease germs which endanger health.

VIEW OF INSIDE PAGES OF KERNIT FOUR-PAGE MAILING BROADSIDE

To prove superior features of the Kernit, we will ship to any gas company a sample unit, for inspection and test, without any obligation or expense.

KERNIT INCINERATOR COMPANY

AMPERE, NEW JERSEY



BARBER *Automatic* JET GAS BURNERS

Home owners are the most important factor in building up every house heating load. The Barber *Automatic* Jet Gas Burner is your means of reaching them and, at the same time, increasing your profits from appliance sales.

All home owners want to have their houses heated comfortably. They dislike shoveling coal and ashes. And they dislike dirty cellars.

That is why sales are easy after the first Barber *Automatic* Jet Gas Burner is installed. A single home owner in a block tells his neighbors about the convenience and cleanliness of heating his house with gas and shows them his equipment. Soon other home owners are demanding that their coal-burning furnaces and boilers also be converted for gas. Sales then spread rapidly from one block to another.

Note These Excellent Features

Automatic Safety Pilot
Minneapolis Thermostat
Barber Butterfly Draft Door
Barber Form Fitting Baffles
Barber Jet Individual Pilots
Minneapolis Electric Gas Valve
Barber Pat'd Jet Burners Units
Barber Gas Distributing Header
Barber Clear Sweep Elbow Manifold

The Barber *Automatic* Jet Gas Burner possesses many new and exclusive features that make it the gas industry's outstanding device for permanently converting coal-burning furnaces and boilers into safe, efficient, economical and automatic gas heaters. As the burner is made to meet the requirements of practically all sizes of furnaces and boilers, the field for sales is almost unlimited.

Do not delay in getting this easy selling appliance on the market. A letter will bring you literature with complete descriptions and prices of these burners. Write today.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK
NEW JERSEY

PRICE *vs.* EFFORT

The most successful manufacturers in every line of business, have been those who made quality goods at a price yielding a fair profit. The article built on price has no solid foundation to rest on. The survivor in any industry must build on the bed rock of quality.

For continued service to you and your customers, sell water heaters which give the maximum of hot water service at the lowest cost,—heaters that will continue to be useful, economical gas users after a period of years, and allow the manufacturer to make a fair return on his investment.

COPPER KOMPAK HEATERS will always deliver clean, economical HOT WATER.

Yours very truly,

THE KOMPAK COMPANY

H. J. Long,
President.

17,611,911 *represents the combined circulation of a single issue of the 12 great publications that will deliver Red Wheel Gas Range advertisements to women during 1929. With few exceptions these ads are all full-pages printed in colors. These advertisements reach every gas-metered home in the United States, not once but many times during the year.*

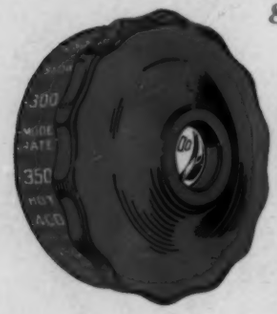
1929 marks the Tenth Anniversary of the beginning of American Stove Company's national advertising campaign on the Lorain [Red Wheel] Oven Heat Regulator . . . the largest, most persistent, most effective advertising effort ever known in the history of gas and gas appliances.

Within and without the industry those who are in a position to judge state that the "Campaign of the Red Wheel" has given to the gas industry the finest and most continuous publicity it has ever received.

In addition, Red Wheel Advertising has raised the quality-standards of gas ranges; enabled retailers to sell on a more profitable basis; and, by creating among consumers a demand for modern, efficient gas appliances, has brought increased happiness to millions of homes. ◆ ◆ ◆ ◆ ◆

AMERICAN STOVE COMPANY

801 Chouteau Avenue • • • • St. Louis, Mo.

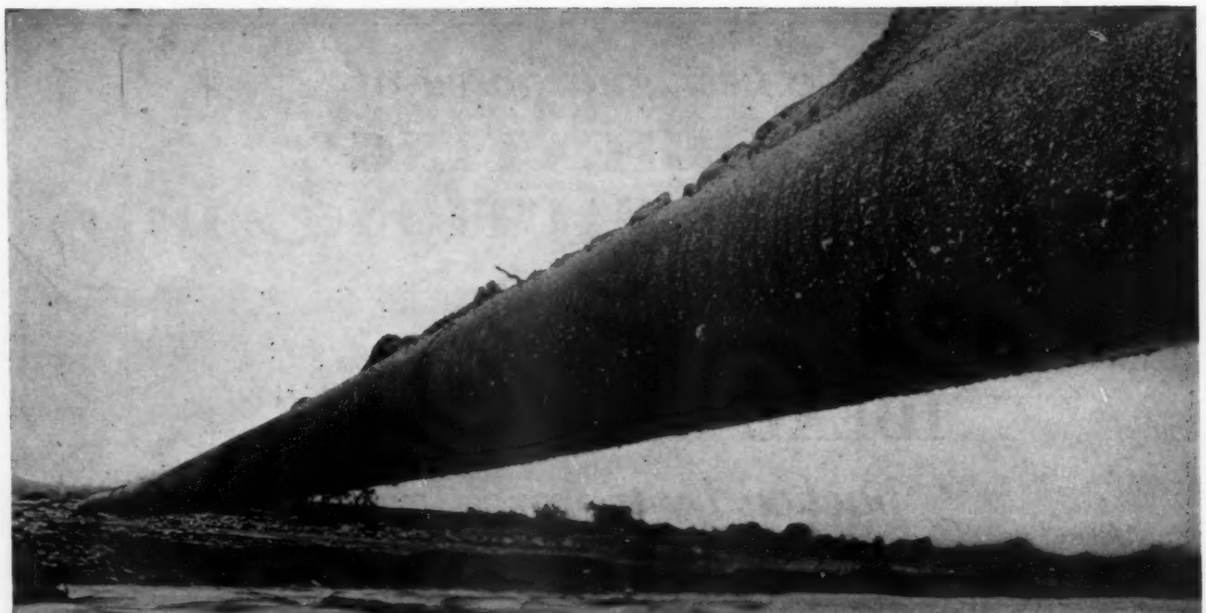


LARGEST MAKERS OF GAS RANGES IN THE WORLD

LORAIN
RED WHEEL

These are the Six Famous Brands of Red Wheel Gas Ranges:

DANGLER · CLARK JEWEL · QUICK MEAL
DIRECT ACTION · NEW PROCESS · RELIABLE



How's this for durable Line Pipe

The raging flood left this temporary tubular bridge unsupported from shore to shore.

The flood waters of a great storm rapidly eroded the channel of this stream and left this "NATIONAL" Pipe Line, originally laid 4 feet below the bottom, exposed to the full force of the raging current, floating debris and timbers.

One can easily realize the strength and durability of the pipe to withstand the terrific strain which the line had to bear. Here is another unquestionable proof of the dependability of "NATIONAL" for manufactured and natural gas service—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY-Pittsburgh, Pa.
***Subsidiary of* United States Steel Corporation**

"NATIONAL"

the best guarantee of

GAS HEATING SATISFACTION

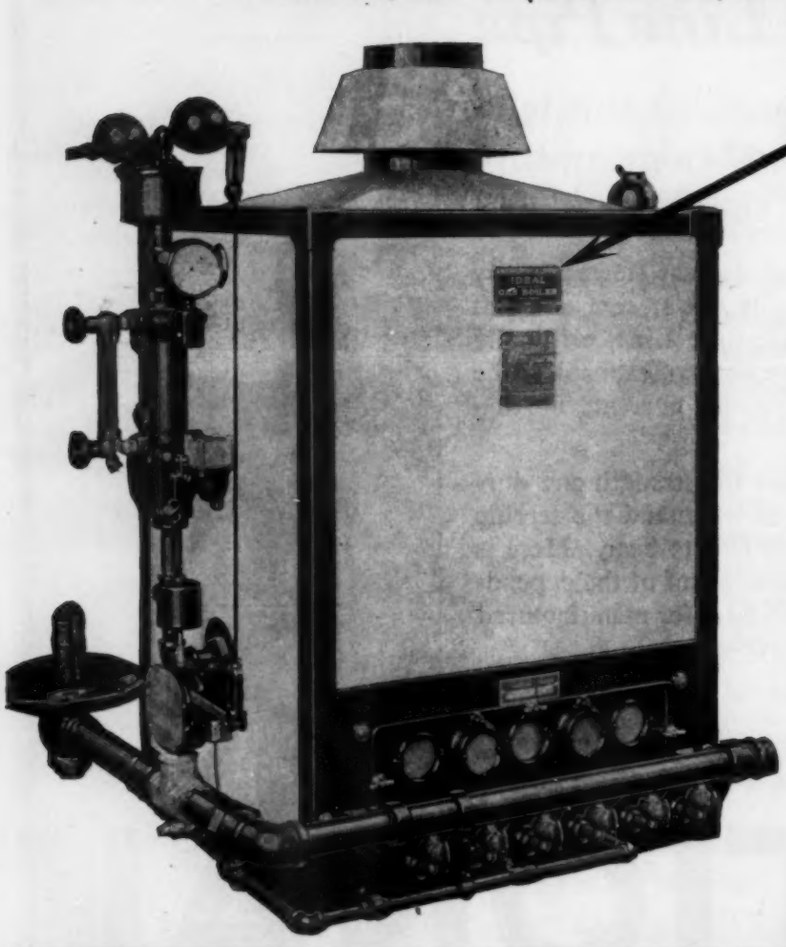
*is the nameplate**

on

IDEAL GAS BOILERS

backed by the prestige of the greatest name in the heating industry

AMERICAN RADIATOR COMPANY



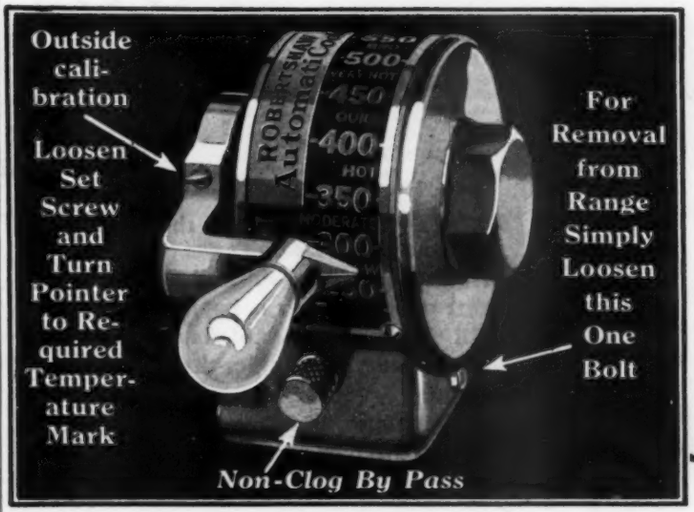
*

Send for full information to

AMERICAN GAS PRODUCTS CORPORATION
376 Lafayette Street
New York

Distributor

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.
Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

Dressing Up

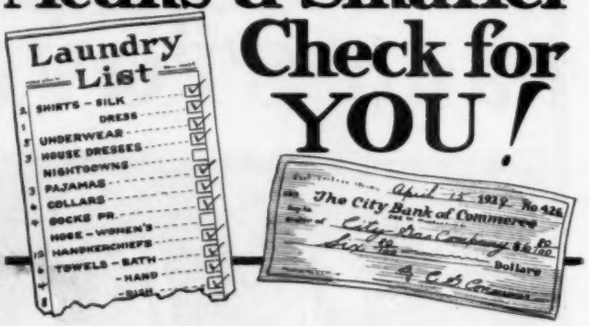
WATER HEATERS, and all the rest of the tribe of gas heating appliances, will be putting on their fine raiment next month to attend the Natural Gas Convention at Kansas City.

The Cleveland Heater Company's family will be there in force: the Rex Automatic Storage Heater, as fine a water heater as money can buy; the Rival Automatic Storage Heater, a sterling heater of the self-contained type; the Rex Tank Heater, a standard unit at a popular price; and the Rex-Patrol Automatic Water Heater, a low-priced automatic, attachable to any range boiler. Each is a skillfully designed and staunchly built device, and each is outstanding in its price class. If you do not know this splendid group of heaters, make their acquaintance at the Natural Gas Exposition.

And, incidentally, before going to the Convention, you should read that interesting new booklet, "The Rex Partnership Plan for Gas Companies." A copy will be mailed to you immediately if you will send us your name and address.

The Cleveland Heater Co.
1900 West 112th St. Cleveland, Ohio

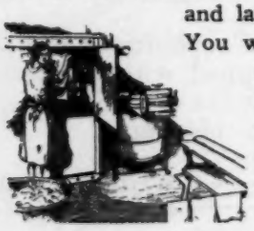
Every "Check" Here Means a Smaller Check for YOU!



EVERY check mark on the laundry list means decreased gas consumption from one of your subscribers. It means that your company is paying the laundry bill through the loss of its domestic load. And when you consider that the domestic laundry load for the average family is approximately 22,000 cu. ft. annually—you realize that your company is paying a lot of money for *business it never gets.*

The family washing *should* be done at home. Clothes can be washed cleaner and with less wear. Fine linens, dainty underthings and tiny baby garments never receive the personal attention at a commercial laundry that they do at home—*and all housewives know this!* They would much rather have their washing done at home if they were *assured* of satisfactory drying on the same day each week. You *can* give them this assurance.

The LAMNECK LAUNDRY DRYER solves *definitely* this biggest of washday problems. It *keeps the washing at home*—assuring the use, at least one day each week, of washer, waterheater, ironer and laundry stove.



You want to retain this domestic laundry load. Let's fight for it. Write or wire us today for detailed information.

The W. E. Lamneck Company
444 Dublin Ave. Columbus, Ohio.

Utica Gas & Electric Co., Harbor Point Plant, Utica, N. Y.

At the Harbor Point plant illustrated, various CE-CO paints have been in use for a number of years, and are successfully meeting the conditions peculiar to the gas industry.

CE-CO PAINTS
LOWER MAINTENANCE COSTS

Rust and disintegration are the inevitable consequences of permitting steel, wood, concrete, brick and other structural materials to remain unpainted, or but poorly protected with paints not specially designed for the requirements of the gas industry.

CE-CO Technical Paints, however, contain pigments and vehicles which our experience of over fifty years in the manufacture of paints for the gas industry has demonstrated conclusively give longer service, better appearance and superior protection than is possible with paints considered solely from the standpoint of "price per gallon", instead of on the basis of *"cost per year of service."*

With CE-CO Technical Paints fewer repaintings are necessary; a statement which has been verified in the experience of many of the representative concerns in the industry.

We shall be glad to send you a list of these concerns, together with literature descriptive of paints designed to lower the cost of plant maintenance.

Send for descriptive literature and color card 3-A.

TECHNICAL CE-CO PAINTS

CHEESMAN-ELLIOT COMPANY, INC.

Established 1876

TECHNICAL PAINT MAKERS

639-647 Kent Avenue - Brooklyn, N. Y.

Works at Brooklyn, N. Y. and Williamsport, Pa.

This Cement

Carries an Unqualified Guarantee of Performance

R & E

R & E No. 3000 Refractory Cement is recommended for all conditions where a refractory cement is used in gas plants, (both water gas and coal gas) and coke ovens.

So convinced are we that this material will perform better than any other refractory cement recommended for the same purpose, that we will refund the full purchase price if the customer is not fully convinced of its superiority.

Distributors with Stock at Convenient Points

Any material carrying a guarantee of this kind is at least worthy of a trial. Packed in 800, 500 and 100 lb. steel drums, orders for R & E No. 3000 Refractory cement in any quantity will receive our prompt and careful attention.

Refractory & Engineering Corp'n.

50 CHURCH STREET - NEW YORK

Western Representatives:
The Gehnrich Corporation, 327 So. La Salle St., Chicago

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD, has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

At House Cleaning Time

the housewife is easily sold on the cleanliness of Gas for house cleaning

Proven Records of Highest Efficiency — Endorsed and sold by the largest number of gas companies

ROBERTS CONTROLLED GAS HEATING UNITS

Quickest and Easiest to Install Dependable

Simplified positive Air Controls Economical

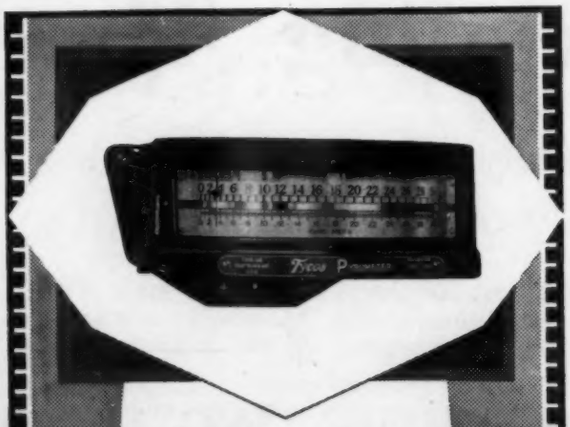
Visit Our Exhibit (Booth 74) at the NATURAL GAS CONVENTION Kansas City May 6-9

Radiant Heat—Reflected where heat does the most good. For steam, hot water and warm air. Fits round, square or rectangular fire boxes. Fully protected by patents.

Write today for full details and carefully planned House Heating Campaign.

ROBERTS GAS BURNER CORPORATION

128 West Chippewa Street Buffalo, N. Y.



Tycos

Indicating Pyrometer

The High-Resistance Indicator illustrated is a sturdy, pivoted-coil instrument of great sensitivity and suitable for exacting service in gas plants.

The mechanism is enclosed in a two-piece moisture-and-dust-proof case, finished instrument-black. An unusually long easy-reading scale is provided, with reflecting mirror, and a combined target-and-knife-edge pointer. The high-resistance moving coil is jeweled with the best grade of Ceylon sapphires, which rotate between two highly-polished tungsten steel pivots, insuring long life and accuracy. The instrument is direct-reading. No suspensions to break, no slide wires, no batteries. The total resistance is 300-900 ohms when calibrated for base-metal thermocouples. When used with rate-metal thermocouples 150-300 ohms. Can be supplied with automatic internal cold-junction compensation if desired.

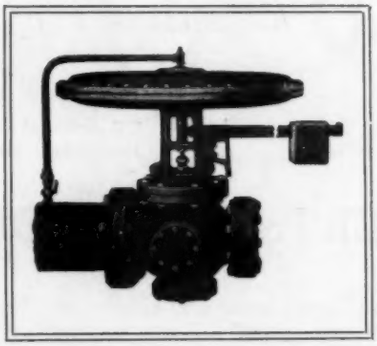
Send for Gas Plant Catalog

Taylor Instrument Companies
ROCHESTER, N. Y., U. S. A.

CANADIAN PLANT MANUFACTURING DISTRIBUTORS
TYCOS BUILDING TORONTO
IN GREAT BRITAIN
SHORT & MASON, LTD., LONDON

Tycos
TEMPERATURE INSTRUMENTS
INDICATING RECORDING CONTROLLING
THE SIXTH SENSE OF INDUSTRY

Efficient Regulation



The Fulton
Low Pressure Regulator

Efficient regulation depends upon the accuracy of the regulation equipment. For 35 years the Chaplin-Fulton Manufacturing Company has made regulating devices for the gas industry. That the aim to make the most accurate and reliable equipment possible has been reflected in the Chaplin-Fulton series of regulators, is evidenced by their popularity and standing with the foremost gas companies.

For an investment in efficient regulation, the following Chaplin-Fulton Regulators offer you the most that can be built into devices for these purposes:

High Pressure Regulators
Low Pressure Regulators
House Regulators
Illuminating or Dead Weight House Regulators
House Service Regulators—Spring Style
High Pressure Spring Regulators
Little Hercules High Pressure Regulators
Gas-Fuel Boiler Governors
Gas Relief Valves
Duplex Sensitive Gas Governors
Back or Check Pressure Regulators

Write for information and catalogues.

The Chaplin-Fulton Mfg. Co.

28-40 Penn Ave. Pittsburgh, Pa.

Under Way . . .

With most of the details of our consolidation now in the category of accomplished facts, the Time-O-Stat Controls Company is busily engaged in making the most of the benefits arising from the merger.

At this time workmen are erecting the new and modern factory buildings which shall give us the needed space. Our engineering and experimental departments are combining the advantages of experience and patent rights obtained from the four predecessor companies so as to give the full effect of those advantages to every item of our production.

Time-O-Stat Controls Company has already promised the industry the finest controls it is possible to build, at prices based on the most efficient and economical production methods. The fulfillment of that promise is under way. An inquiry from you will bring our new catalog, placing before you in detail latest Time-O-Stat improvements.

TIME-O-STAT CONTROLS COMPANY
ELKHART, INDIANA

Successor to
Absolute Con-Tac-Tor Corporation
Time-O-Stat Corporation
Cramblet Engineering Corporation
Leachwood Company

Manufacturers of AUTOMATIC CONTROLS *for*
Oil Burners - Gas Burners - Electric Refrigerators - Mechanical Stokers - Furnace Fans
Industrial Ovens - Ice Machines - Unit Heaters - Water Heaters - *Also* Sign Flashers
Mercury Switches - Electric Heaters - Corrugated Metal Bellows

WHEN TEMPERATURES ARE IMPORTANT

Only the Best Thermometer Pays

THE American Industrial Thermometer is accurate. When requested, a test certificate is issued with each thermometer, which assures its accuracy by comparison with a U. S. Bureau of Standards Certified Thermometer. Never guess at temperatures and never take chances with the accuracy of the thermometer you buy.

The case is made of cast brass, "V" shaped, all black enameled. A plate glass front protects the scale. The scale is hand-calibrated to its respective tube and the subdividing lines are engraved (not stamped). The glass tube is thoroughly annealed for 6 days for permanent accuracy. Only double distilled mercury is used, and the tube is filled with nitrogen gas to prevent separation of the mercury column. The bulb chamber is Monel Metal, giving maximum strength and protection against corrosion.

American Thermometers are made in all styles for every individual purpose. Scale sizes are 7", 9" and 12". Standard ranges are from minus 40 to 1000° F.

When temperatures are important, only the best thermometer pays.

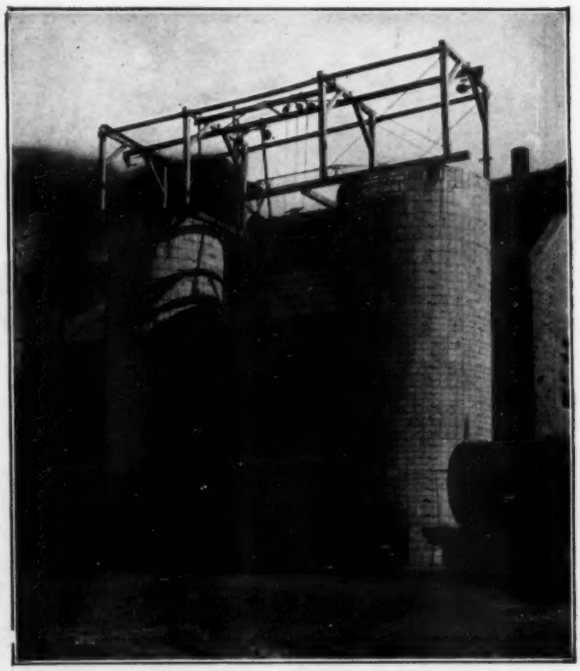
Specify Catalogs Desired

Gas Maker's Gauge	P-7
Recording Thermometer	H-7
Temperature Controller	R-7
Recording Gauge	E-7
Glass Thermometer	F-7

AMERICAN INSTRUMENTS

Since 1851

CONSOLIDATED ASHCROFT HANCOCK CO. INC.
Subsidiary of Manning, Maxwell and Moore Inc.
100 East 42nd Street, New York City



Cuts Costs and Increases Efficiency

This Godfrey installation at the plant of the Western United Gas and Electric Co., in Du Quoin, Illinois, enables one man to take the place of a whole gang and reduces the cost of coal-handling to a minimum unapproached in the history of conveying equipment.

The coal flows through drop-bottom cars through a track hopper into the conveying bucket and is then raised and carried along the monorail to the desired point of unloading, where it is lowered until it comes in contact with the pile or floor of bin. This contact causes the bucket to divide in the center and discharge its contents with no perceptible breakage.

The one bin has an opening at the bottom which supplies coal to the boiler room, and the other bin has an opening into the second floor which supplies coal to the retorts. The law of gravity is thus employed to do the work of men.

There are many other advantages of the Godfrey System, too numerous to mention here. Send for complete information about this time, labor and money saving equipment Today!

Ask for Bulletin A-259

GODFREY CONVEYOR COMPANY
Elkhart, Indiana

Godfrey CONVEYOR

GODFREY KNOWS HOW—*By Experience!*

It Sounds like *FICTION*

NOT one in more than *five million* bills returned with an error.

This extraordinary record of accuracy made by one of the largest Public Utility Companies in the country with REMINGTON PUBLIC UTILITY BILLING AND BOOKKEEPING MACHINES can scarcely be believed. To all but those who know Remington accuracy it sounds like fiction. Unusual? Yes. But true, nevertheless.

The monthly bill is perhaps your only point of contact with your customer. It must be accurate, neat and easily understandable. That's why you need a Remington.

But it's not the only reason. Remington offers you another distinct advantage. A special bookkeeping system, known as the Register Sheet Method of Ledgerless Bookkeeping. It cuts filing space in half. Positively prevents misfiling. Increases billing and posting volume through undreamed-of speed. It supplies you with complete information concerning any customer's account . . . instantly available for comparative statements, adjustment of complaints, etc.

For further particulars about this machine write for Special Public Utility Accounting folder or phone our nearest office for a demonstration.

Accounting Machine Division

Remington Rand Business Service *Inc.*

Buffalo, N. Y.

Branch offices in all principal cities

Accounting Machine Division, Remington Rand Business Service *Inc.*, Buffalo, N. Y.
You may send me additional information regarding Remington Public Utility Billing and Bookkeeping Machines.

Name_____ Address_____

City_____ State_____

A. G. J-4.

Buyers' Reference Index

See page 129 for advertisements of these products

A. B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ABSORBERS
Aluminum Co. of America

ACCUMULATORS—STEAM
The Gas Machinery Co.
Kuth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE
The Prest-O-Lite Co., Inc.
Oxweld Acetylene Co.

ACETYLENE EQUIPMENT
American Lava Corp.
Alexander Milburn Co.

ACCOUNTING MACHINES
Remington Rand, Inc.

AIR FILTERS
Staynew Filter Corp.

ALUMINUM PAINT
Aluminum Co. of Amer.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
Indugas, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Connersville Blower Co., The.
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Indugas, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Combustion Engineering Corpn.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The

BRICK
Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment Co.-Russell Eng. Corp.
United Engineers & Constructors, Inc.
United States Refractories Corp.
Silica
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.
United States Refractories Corp.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUILDINGS
United Engineers & Constructors, Inc.

BURNERS (Industrial)
American Lava Corp.
The C. M. Kemp Mfg. Co.
Conversion
Cleveland Gas Burner & Appliance Co.
Conversion House Heating
Roberts Gas Burner Corp.
Fuel
Cleveland Gas Burner & Appliance Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Indugas, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock Inc., Co.

CALORIMETERS
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBIDE
Union Carbide Sales Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
Quigley Furnace Spec. Co., Inc.
Acid-proof
Botfield Refractories Company.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
United States Refractories Corp.
Refractory
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory Engineering Corp.
United States Refractories Corp.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
Eaton-Kent, Inc.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Boone County Coal Corpn.
Westmoreland Coal Co.

COAL GAS APPARATUS
Bartlett-Hayward Co.
Indugas, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company.
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.

COAL TAR PRODUCTS
International Combustion, Tar, and Chemical Corpn.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.
Meter
American Meter Co.
Superior Meter Co.
Service
American Meter Co.

COKE CRUSHERS
The Koppers Construction Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Aluminum Co. of America.
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors Inc.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
The Brown Instrument Co.
Robertshaw Thermostat Co.
Time-O-Stat Controls Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.

CONCENTRATORS, AMMONIA
(See Ammonia Concentrators.)

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

COOLING COILS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

MITCHELL
ELECTRIC VIBRATING SCREEN

Especially adaptable to the screening of coal and coke. In the re-screening of coke, the terrific vibrations, occurring 3,600 times a minute, remove all breeze at the lowest cost per ton. It requires minimum floor space and head room. It is self-contained, dust and water proof. Requires less than ¾ H. P. per standard screen

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-Off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope, and the "Flotograv" (Coke Reclamation System).

C.W.HUNT CO. Inc.
WEST NEW BRIGHTON,
STATEN ISLAND, N. Y.
Chicago - Montreal - Boston

HUNT

GOODMAN
Used since 1897
Improved Locking Sleeve
GAS MAIN STOPPER

STREET DEPARTMENT SUPPLIES

DEPENDABLE GAS MAIN BAGS
Type A—Seamless
Type B—Reinforced Seams
Type C—Canvas Covered
GOODMAN CYLINDRICAL STOPPER
Inflatable for high pressures
SOAP TAPE
BRUSHES
PLUGS
JOINT RUNNERS
AIRLINE MASKS

Safety Gas Main Stopper Co.
523 Atlantic Ave., Brooklyn, N. Y.

Is it Shortening the Life of Your Compressors?

Unfiltered air contains upwards of 100,000 dust particles per cubic inch—*About a half pound of sand and grit for every million cubic feet of air you compress!* This abrasive matter grinds and scores smooth reciprocating parts—cuts down operating efficiency — and it shortens the life of pneumatic equipment.

Install Protectomotor Air Filters and your compressors, engines, blowers and compressed air tools will operate with air that is guaranteed to be 99 9/10% CLEAN.

Protectomotor

Sectional View Model C P Pipe Line Filter

THE PROTECTOMOTOR reduces carbon deposits by as much as 70%. It reduces normal wear by as much as 85%. And it enables you to operate three to five times longer without overhauling.

This remarkable device has no valves or moving parts. Nothing to get out of order. No tanks, cleaning solution or spare parts required. Needs cleaning only twice a year. Simply install it and forget it. Over 250,000 in use.

Also made for installation in pipe lines, Delivers clean, dry air, free from dust, water, oil, rust and scale, for paint spraying, compressed-air tools, hoists, cleaning operations, agitating liquids, etc.

Illustrated booklet tells complete story. Write for it today and get the facts on increasing the life of your pneumatic equipment. Or simply mail the coupon.

STAYNEW FILTER CORPORATION
115 N. Water St. Rochester, N. Y.

PROTECTOMOTOR
REG. U.S. PAT. OFF.
99 9/10 Per Cent EFFICIENT
AIR FILTERS

STAYNEW FILTER CORP.
115 N. Water St., Rochester, N. Y.

Please send copy of your Booklet on Protectomotor Air Filters.

To use on.....

Name.....

Address.....

Town.....State.....

Buyers' Reference Index

See page 129 for advertisements of these products

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUTTING APPARATUS & SUPPLIES
Alexander Milburn Co.
Union Carbide & Carbon Co.

CRUSHERS
Riter-Conley Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.

DEMONSTRATION METERS
Lambert Meter Co.

DIAPHRAGMS
Lambert Meter Co.
(Meter)
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

DRYERS (Laundry)
W. E. Lamneck Co.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
Robins Conveying Belt Co.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.

EXHAUSTERS
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.

EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

FILES (Steel and Wood)
Remington Rand, Inc.

PILES (Visible)
Remington Rand, Inc.

FILTERS, Gas
American Meter Co.

FIREBRICK, CEMENT
General Refractories Co.
Quigley Furnace Specialties Co., Inc.

FIREBRICK CHECKER BRICK
(See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
Brown Instrument Co., The
Lambert Meter Co.

FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons.
Semet-Solvay Engineering Corp.

FURNACES
Combustion Engineering Corpn.
James B. Clow & Sons.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.

GAS ANALYSIS APPARATUS
Metric Metal Works.

GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc.
Pittsburgh Equitable Meter Co.

GAS COAL
Boone County Coal Corpn.
Pittsburgh Coal Co.
Westmoreland Coal Co.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Indugas, Inc.
Gas Engineering Co.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATE VALVES (See Valves)

GATES—WIND & BLAST
The P. H. & F. M. Roots Company.

GAUGE BOARDS
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Taylor Instrument Companies.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

GENERATORS, Oxygen & Acetylene
Alexander Milburn Co.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

HEATERS
Feed Water
Andale Company.
House
American Gas Products Corp.
Cleveland Gas Burner & Appliance Co.
The Cleveland Heater Company.
Roberts Gas Burner Corp.
Room
American Gas Products Corp.
American Stove Company.
Homestead Heater Company.
Welsbach Company.
Water
The Cleveland Heater Company.
Humphrey Company.
Ruud Mfg. Co.
Kompak Company.
Welsbach Company.
Pittsburg Water Heater Co.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
C. W. Hunt Co., Inc.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
Connelly Iron Sponge & Governor Co.

INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

FLANGE END

VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

The LUDLOW

VALVE MANUFACTURING COMPANY
TROY, N. Y.

New York 81 Fulton St. | Boston Tremont Bldg. | Philadelphia Harrison Building
Chicago The Rookery | Pittsburgh Oliver Bldg. | Kansas City R. A. Long Bldg.

RITER-CONLEY CO.

STEEL CONSTRUCTION
PITTSBURGH

STEEL PLATEWORK
FOR
THE GAS INDUSTRY

Gas Holders
Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

BRANCH OFFICES

New York — Boston — Baltimore
Chicago — Philadelphia — Detroit
Cleveland — Cincinnati — Seattle
San Francisco — Los Angeles

Byllesby Engineering and Management Corporation

BYLLESBY
PIONEERS IN PUBLIC SERVICE
ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK

Pittsburgh San Francisco

LEADING GAS COMPANIES USE LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

Buyers' Reference Index

See page 129 for advertisements of these products

Recording
American Meter Co.

JOINTS (Pipe)
S. R. Dresser Mfg. Co.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.
Victaulic Co. of Amer.

JOINT RUNNERS
Safety Gas Main Stopper Co.

LAMP POSTS
General Gas Light Co.

LAUNDRY EQUIPMENT
W. E. Lamneck Co.

LAVA BURNER GRIDS
American Lava Corp.

LAVA PILOT TIPS
American Lava Corp.

LINING—REFRACTORY
(See Refractory Linings

LOCKERS
Remington Rand Co.

LOOSE LEAF EQUIPMENT
Remington Rand Co.

LUX MATERIAL
Alpha-Lux Company.

LUX SPONGE
Alpha-Lux Company.

MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.

MANOMETERS
Brown Instrument Co., The
Precision Thermometer & Instrument Company.

MANTLES
General Gas Light Co.
Welsbach Company.

MASKS—GAS
Safety Gas Main Stopper Co.

MAST & GAFF OUTFITS
C. W. Hunt Co., Inc.

MEASURING CHUTES
C. W. Hunt Co., Inc.

MECHANICAL GENERATORS for Water Gas App.
United Engineers & Constructors, Inc.

METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
D. McDonald & Co.
Maryland Meter Works.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.

METER REPAIRING
Lambert Meter Co.

METER TESTER, Hydro-Pneumatic
American Meter Co.

METERS
Brown Instrument Co., The
Pittsburgh Equitable Meter Co.
Air
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Artificial
American Meter Co.
Connersville Blower Co., The
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
Neptune Meter Company.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Nathaniel Tufts Meter Works.
Demand
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Lambert Meter Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Demonstration
American Meter Co.
Dry
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Exhibition
American Meter Co.
Natural Gas
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Meter Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Oil
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Orifice
American Meter Co.
Positive
The Sprague Meter Co.
Prepayment
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Proportional
The P. H. & F. M. Roots Company.
Station
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
Nathaniel Tufts Meter Works.
The Western Gas Construction Company.
Steam
American Meter Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Test
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Wet Test
American Meter Co.

MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.

MIXERS, GAS
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.

MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.

MOTOR CARS
C. W. Hunt Co .,Inc.

NAPHTHALENE EXTRACTORS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

OFFICE FURNITURE
Remington Rand, Inc.

ORE, CHROME
E. J. Lavino & Co.

OVENS (REEL TYPE BAKE)
The Bruce McDonald Co.

OVENS—COKE AND GAS
Indugas, Inc.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

OXIDE
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.

OXYGEN
Linde Air Products Co.

OXYGEN AND HYDROGEN METERS
Lambert Meter Co.

PACKING
Asbestos
Safety Gas Main Stopper Co.

PAINTS
Aluminum Co. of America.
Cheesman-Elliott Co.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Aluminum Co. of America.
Semet-Solvay Co.

PAINTS, ANTI ACID AND ALKALI
Aluminum Co. of America.
Cheesman-Elliott Co.
Quigley Furnace Spec. Co., Inc.

PAINTS, RUSTPROOF
Aluminum Co. of America.
Cheesman-Elliott Co.
Quigley Furnace Spec. Co., Inc.

PHOTOMETERS
Connelly Iron Sponge & Governor Co.

PIOTS-SAFETY
Time-O-Stat Controls Co.

PIPE
Waylow Pipe Co.
Hedges-Walsh-Weidner Co.
National Tube Co.
The Stacey Mfg. Co.
Bell
American Meter Co.
Seraet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Flange
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
McWane Cast Iron Pipe Co.
Seamless Steel
Pittsburgh Steel Products Co.
Spigot
McWane Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Naylor Spiral Pipe Co.
Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Pittsburgh Steel Products Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Spiral Pipe
Naylor Spiral
Welded Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.

PIPE COATINGS
Wailes-Dove-Hermiston Corp.

PLANTS—GAS, COMPLETE
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

PLATES
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.

PLUGS, SERVICE AND MAIN
Rubber
Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.

PORTABLE TEST METERS
Lambert Meter Co.

PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PRODUCER GAS STEAM
American Meter Co.

PROVERS—Critical Flow for H. P Field Testing
American Meter Co.

PROVERS—METER
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Sunerior Meter Co.

PUMPS
Drip
American Meter Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Gas
The P. H. & F. M. Roots Company.
Gas Bag
Safety Gas Main Stopper Co.
Hand
Lambert Meter Co.
Oil
Connersville Blower Co., The
The Gas Machinery Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Power
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Pressure
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Service
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
Service Cleaner
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.
Tar
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Water
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Vacuum
American Meter Co.
Connersville Blower Co., The
The P. H. & F. M. Roots Company.

PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas. Const. Co.
The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

The All-Purpose Gas Oven

For all baking operations, THE MEEK REEL OVEN, embodying the perfected principle of "motion in baking" is without a peer. Write us, telling us your problem. Our experience with thousands of oven users will be at your disposal. Ask for catalog.

The Bruce McDonald Co.,
2015 Washington St.,
KANSAS CITY, MO.

HYTEMPITE

(Reg. U. S. Pat. Off.)

"The Universal High Temperature Cement"

For Gas Plants

—insures quick, economical repairs of Retorts, Jamb Joints, Furnace Walls, Arches and Baffles

—can be used with salvaged, crushed old fire brick

—is not affected by heating and cooling of ovens.

—stands up under severe weather conditions.

—makes thin, strong joint between tile or brick that stands up under extreme abrasive action of clinker tools.

—is easily shot into place with Quigley Refractory Gun.

Keep a drum of HYTEMPITE in Retort House or Boiler Room for quick repairs.

Quigley Furnace Specialties Co., Inc.
26 Cortlandt St. New York, N. Y.
Stock and Service in every Industrial Center.
HYTEMPITE is a Quigley Product.

GAS OUTLETS

(Patented)

Lava, as a seat for gas consumption, is the material approved by manufacturers of gas appliances. Lava is an ideal, hard, non-corrosive substance that preserves the uniformity of the gas flame.

American Lava Corporation
29-59 William St. Chattanooga, Tenn.
Manufacturers of Lava Tips & Heat Resistant Insulators.

OF INTEREST TO EVERY PLANT PUMPING DIRTY WATER

THE ANDALE SELF CLEANING ROTARY STRAINER FOR CONTINUOUSLY STRAINING LEAVES, GRASS AND OTHER MATTER FROM WATER AND AUTOMATICALLY DISCHARGING THE REFUSE.

Write for Bulletin 129.

ANDALE COMPANY
1600 ARCH STREET
PHILADELPHIA, PA.

Buyers' Reference Index

See page 129 for advertisements of these products

PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PYROMETERS
Maryland Meter Works
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.

RANGES—GAS
American Stove Co.
Eriez Stove Mfg. Co.

RECORDING DEMAND METERS
Lambert Meter Co.
Maryland Meter Works

REFRACTORY CEMENTS
Botfield Refractories Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
United States Refractories Corp.

REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.

REFRACTORY LININGS
Alpha-Lux Company
Botfield Refractories Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company
United States Refractories Corp.

REGULATORS
American Meter Co.
The Chaplin Fulton Mfg. Co.
Connersville Co., The
Connelly Iron Sponge & Governor Co.
Grobie Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
Time-O-Stat Controls Co.
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Oxygen & Acetylene
Alexander Milburn Co.
Steam Pressure
Smoot Engineering Corp.

REPAIR PARTS
Lambert Meter Co.

RESPERATING OUTFITS
Connelly Iron Sponge & Governor Co.

RETORTS
Horizontal and Inclined
Improved Equipment—Russell Engineering Corp.
Vertical
United Engineers & Constructors Inc.
West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
The Gas Machinery Company
United States Refractories Corp.

RETORT CEMENT
Alpha-Lux Company
Botfield Refractories Company
The Gas Machinery Co.
Improved Equipment—Russell Engineer Corp.
Quigley Furnace Spec. Co. Inc.
United States Refractories Corp.

REVERSE FLOW GOVERNORS
Connelly Iron Sponge & Governor Co.

REYNOLDS
District
Reynolds Gas Regulator Co.

RUBBER AND JUTE JOINTING MATERIALS
Southwestern Pipe Joint & Eng. Co. Inc.

SAFES
Remington Rand Inc.

SAFETY VALVES
Connelly Iron Sponge & Governor Co.

SCREENS, ELECTRIC VIBRATING
C. W. Hunt Co. Inc.

SCRUBBERS
Bartlett Hayward Co.
Cruse-Kemper Company
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Company

SERVICE BOXES
The Stacey Mfg. Co.

SERVICE CLEANERS
American Meter Co.

SERVICE PLUG-RUBBER
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

SHELVING (Steel)
Remington Rand Inc.

SKIP HOIST
C. W. Hunt Co. Inc.

SPECIFIC GRAVITY APPARATUS
American Meter Co.

SPECIFIC GRAVITY GAUGES
Alpha-Lux Company.

SPONGE
Alpha-Lux Company
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co. Inc.

SPRAYS, for Water Gas Machines
Semet-Solvay Engineering Corp.

SPRAYERS, PAINT
Alexander Milburn Co.

STACEY BULLETT for High Pressure Storage
Stacey Bros. Gas Construction Co.

STATION METERS (See Meters Station)

STEAM ACCUMULATORS (See Accumulators—Steam)
The Gas Machinery Co.
Smoot Engineering Corp.
United Engineers & Constructors Inc.
The Western Gas Construction Company

STOPPERS
Safety Gas Main Stopper Co.

STRAINERS—GAS, STEAM, WATER
Andale Company

STREET DEPT. EQUIPMENT
American Meter Co.
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

STREET LAMPS
Welsbach Street Lighting Co.

SULPHUR AND AMMONIA TEST (Apparatus)
American Meter Co.

SYSTEMS
Combustion Control
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
Hot Water Heat Control
The Cleveland Heater Company
Time-O-Stat Controls Co.

TABULATING MACHINES
Remington Rand, Inc.

TACHOMETERS
Brown Instrument Co., The
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.

TANK REGULATORS
Reynolds Gas Regulator Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Company.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Gas, Oil, Storage
Stacey Bros. Gas Const. Co.
High Pressure
The Gas Machinery Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.

TAPE SOAP—BINDING
Safety Gas Main Stopper Co.

TAR DISTILLING PLANTS
Indugas, Inc.
Gas Engineering Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.

TAR DISPLACEMENT SYSTEM
The Gas Machinery Co.

TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

TEMPERATURE CONTROLING DEVICE—Oven
American Stove Co.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Robertshaw Thermostat Co.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

TESTING APPARATUS, GAS
American Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.

THERMOMETERS
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Superior Meter Co.
Taylor Instrument Companies.

THERMOSTATS
The Bristol Company.
Brown Instrument Co., The
The Cleveland Heater Company.
Consolidated Ashcroft Hancock Co., Inc..
Precision Thermometer & Instrument Company.
Robertshaw Thermostat Co.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

TOASTERS
American Gas Products Corp.
Savory Co., Inc.,

TOOLS
Semet-Solvay Engineering Corp.

TORCHES—WELDING AND CUTTING
Alexander Milburn Co.
Oxweld Acetylene Co.
Union Carbide & Carbon Co.

TRAPS—STEAM
Consolidated Ashcroft Hancock Co., Inc.,

TRENCH DIGGERS
The Cleveland Trencher Co.

TUBES, BOILER
National Tube Co.
Pittsburgh Steel Products Co.

TUBES
Seamless Steel
Pittsburgh Steel Products Co.

TYPEWRITERS
Consolidated Ashcroft Hancock Co., Inc.,
Remington Rand, Inc.

U GAUGES
American Meter Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Safety Gas Main Stopper Co.
Superior Meter Co.
Taylor Instrument Companies.

VACUUM GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.,
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

VALVES
Bartlett-Hayward Co.
Consolidated Ashcroft Hancock Co., Inc.,
Darling Valve and Manufacturing Co.
The Gas Machinery Co.
Groble Gas Regulator Co.
C. W. Hunt Co., Inc.
The Ludlow Valve Mfg. Co.
Pittsburgh Equitable Meter Co.
Semet-Solvay Engineering Corp.
High Pressure Special
Smoot Engineering Corp.
Time-O-Stat Controls Co.

VALVES—BY-PASS
The P. H. & F. M. Roots Company.

VALVES—DIAPHRAGM
The P. H. & F. M. Roots Company.
Time-O-Stat Controls Co.

VALVES & FITTINGS
Darling Valve and Manufacturing Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Time-O-Stat Controls Co.

VALVES—HUNTOON
The P. H. & F. M. Roots Company.
Time-O-Stat Controls Co.

VALVES—RELIEF
The P. H. & F. M. Roots Company.

VALVES—3 Way
Semet-Solvay Engineering Corp.

WASTE HEAT BOILERS (See Boilers)
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

WATER GAS APPARATUS
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

WELDING EQUIPMENT
Oxweld Acetylene Co.

WESTMORELAND "CRITERION" GAS COAL

The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad.
in Westmoreland County, Pa.

THE WESTMORELAND COAL COMPANY
Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.
Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P Co.

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

LAVINO OXIDE

Intensely Active. High Total Sulphur Absorption at Minimum Cost.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.
NEW YORK CHICAGO PITTSBURGH

GAS ENGINEERING CO.

Manufacturers of Gas Production Equipment
TRENTON, N. J.

JOHN S. UNGER
GAS ENGINEER
Specialist in Ammonia Recovery
and Manufacture of Ammonia Products,
Builder of Unger Ammonia Stills
640 GRACE ST., CHICAGO

The New 1928 Improved FRANKLIN Gas Burner—

Positively the last word in the practical and efficient combustion of the gases in which air and gas are mixed to the highest degree of perfection. Easily and quickly installed. Can be used on any coal-fired boiler or hot air furnace.

Patented and Manufactured Exclusively by

THE FRANKLIN GAS APPLIANCE CO.
CINCINNATI, OHIO

SERVICE TO THE INDUSTRY

REORGANIZATIONS and MERGERS

of the Public Utilities resulting in economies of operation have benefited the entire gas industry.

MANUFACTURERS OF GAS APPLIANCES now realize the necessity of a similar development in their industry if they are to be of real service to the Utilities in the matter of future sales and dealer cooperation.

INVESTIGATION OF THE INDUSTRY

has shown decided opportunities for economies in manufacturing and marketing. Many manufacturers can improve their situation by *Reorganization, Merger or Refinancing.*

PERMANENT CAPITAL—

is available through my association with reliable banking institutions in Chicago—New York—Philadelphia.

THIS SERVICE IS CONFIDENTIAL—

May we have the pleasure of serving you?

CHARLES W. WARDELL

2401 CHESTNUT STREET, PHILADELPHIA, PA.

CLASSIFIED ADVERTISEMENTS

Rate at $5.00 per inch for first insertion. $4.00 per inch for each additional insertion of same Copy. Positions wanted—$2.00 per issue.

POSITION OPEN

Large eastern utility wants Sales Engineer (Mechanical or Chemical preferred) 27 to 32 years of age, to sell manufactured gas for heating processes. Knowledge of combustion, furnace design and construction and modern industrial heating practices desirable. Address Box 965 c/o American Gas Journal, 53 Park Place, N. Y. C.

WANTED—A New England States salesman to represent a large coal Company. Must be familiar with genuine Youghorgheny Gas Coal. A worth while arrangement will be made with the right party. Address Box 957, c/o American Gas Journal, 53 Park Place, New York City.

HOUSE HEATING ENGINEER

To supervise sales and service in connection with the use of gas for house heating. Requirements:—College graduate 32 to 40 years old. At least 5 years' experience in combustion engineering and plant operation; also a thorough knowledge of house heating equipment and systems and of sales promotion work. Give age, education, experience and salary desired at start. Address Box 964, c/o American Gas Journal, 53 Park Place, New York City.

STOCKHOLDERS and MAILING

LISTS

For SECURITY DISTRIBUTION

Corrected regularly—Sold with a guarantee

ASK FOR CATALOG

American Mailing Service, Inc.
225 Varick St., N. Y. C.

The following applicants listed in our Employment Service are experienced men, who in most cases, desire to make changes in their positions so they may broaden the scope of their activities. We will be pleased to put them in contact with any company desiring their services. In answering please refer to box number indicated.—Employment Service.

WANTED—SALESMAN—For a high-grade line of Gas Ranges, both domestic and hotel types—one with experience and some acquaintance with Public Service Companies in Michigan, Indiana, Illinois and Iowa preferred. A good opportunity for a live man. Address Box 960, c/o American Gas Journal, 53 Park Place, New York City.

POSITION WANTED

Good merchandiser. Will go anywhere. Available immediately. Address Box 961, c/o American Gas Journal, 53 Park Place, New York City.

MANUFACTURER'S REPRESENTative desires to make contact with manufacturer as a sales representative. Had three years' experience as sales engineer in house heating and all types of domestic appliances and industrial work. Three years' selling specialties and four years as a vocational training officer. Young, energetic. Married. Address Box 954, c/o American Gas Journal, 53 Park Place, N. Y. C.

A Successful Manager and Operator desires to make a change from present location and will welcome communication from parties interested in securing the services of such a man. Address Box No. 963, c/o American Gas Journal, 53 Park Place, N. Y. C.

SALESMAN, with wide experience, including sales promotion, desires connection as representative for manufacturer. Acquainted with gas companies and dealers in territory from Boston to Washington. Proposition on agency basis for Eastern territory or Pacific Coast also considered. Address Box No. 959, c/o American Gas Journal, 53 Park Place, New York City.

A thorough experienced Gas Salesman having a broad acquaintance with Gas Companies and Gas Appliance Dealer trade, desires to make connection with some reliable gas Appliance Manufacturer to represent them in the eastern territory. Address Box No. 958, c/o American Gas Journal, 53 Park Place, N. Y. C.

Salesman with wide acquaintance amongst Gas Companies and dealers in Pennsylvania, New Jersey, West Virginia, and New England desires to make change and would represent manufacture of quality product in any of territory named. Can furnish A.1. references. Available March 1st. Address Box No. 964. c/o American Gas Journal, 53 Park Place, New York City.

American Light & Traction Company

"DIVIDEND NOTICE"

The Board of Directors of AMERICAN LIGHT & TRACTION COMPANY, at a meeting held April 2, 1929, declared a DIVIDEND of one and one-half per cent. (1½%) on the Preferred Stock, and a DIVIDEND of two and one-half per cent. (2½%) on the Common stock, both payable May 1, 1929, to stockholders of record at the close of business April 18, 1929. The transfer books will not be closed.

JAMES LAWRENCE,
Secretary

GAS PLANT EQUIPMENT: Capacity 5,500,000 cu. ft. Consisting of 4 - 10' Lowe Water Gas Sets; 2 - Hinman, Drum Station Meters, and all auxiliary apparatus—where and as is. For details apply.

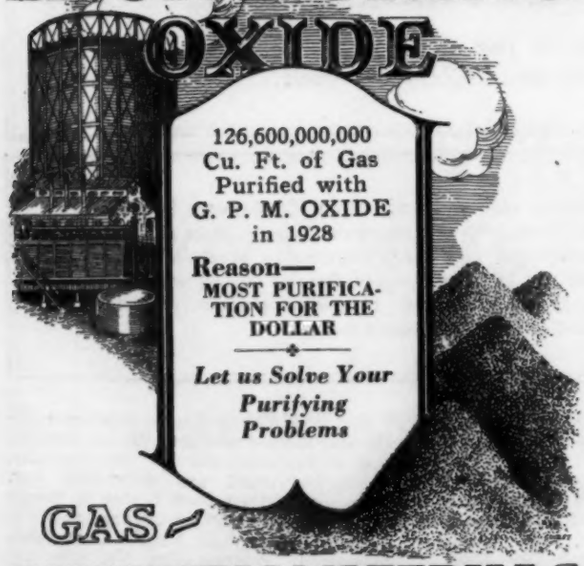
J. F. Hunter, Engr. of Construction, Consolidated Gas Co. of New York, No. 4 Irving Place, New York City.

1876 **PURIFYING MATERIAL, — BAGGED OR BULK**
Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT 1929

IRON Connelly Iron Sponge and Governor Co. New York, Chicago U.S.A. **SPONGE**

USE THE BENEFIT OF 53 YEARS EXPERIENCE!

IRON BORING OXIDE



126,600,000,000
Cu. Ft. of Gas
Purified with
G. P. M. OXIDE
in 1928

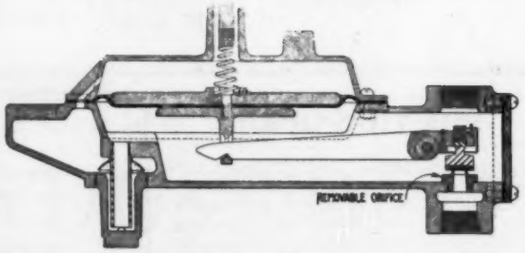
Reason—
MOST PURIFICATION FOR THE DOLLAR

Let us Solve Your Purifying Problems

GAS PURIFYING MATERIALS COMPANY INC.

FOOT OF HALSEY STREET · · · LONG ISLAND CITY
NEW YORK
BRANCH YARD—PROVIDENCE, R. I.

GROBLE REGULATORS & GOVERNORS



FEATURES IN GROBLE'S ARE WORTHY OF YOUR MOST SERIOUS CONSIDERATION.

Accessibility of valve.
Removable orifice.
Simplicity of complete repair while in service.

These items improve pressure regulation and lower maintenance cost.

GROBLE GAS REGULATOR COMPANY
Anderson, Indiana

Representatives
Utilities Service Co., Peoples Gas Building, Chicago.
H. E. Broughton, 404 Donovan Building, Detroit.
Midland Supply Co., Dwight Bldg., Kansas City, Mo.
Seidenglanz & Co., Second Unit, Santa Fe Bldg., Dallas.
Fagan-Andrews Co., 135 Michigan St., Milwaukee

EVERY GAS PLANT NEEDS

ADAMANT
Fire Brick Cement
ADACHROME
ADACHROME
Fines
ADAPATCH
The ADAMANT
Gun

IF you will send us an outline of your refractories difficulties, we shall be glad to submit suggestions.

BOTFIELD REFRACTORIES COMPANY
Swanson and Clymer Sts., Philadelphia, Pa.

HOMESTEAD FIRES

Radiant "Coalfires"
Radiant "Woodfires"

Homestead Heater Company, Inc.
Selvage St. and Fabyan Pl., Newark, N. J.

FOR BY-PRODUCT COKE OVENS
GAS RETORTS and BOILER SETTINGS
FINE GROUND CLAY — SILICA CEMENT

U·S·REFRACTORIES CORPORATION
MOUNT UNION, PA.—OLIVER BLDG. PITTSBURGH.

Pittsburg
Automatic Gas
Water Heaters and Gas Fired Boilers

The Pittsburg Water Heater Company
Pittsburgh, Pa.

ALPHABETICAL LIST OF ADVERTISERS

Alpha Lux Co., Inc., ... 56-57
American Gas Products Corp. 96
American Lava Corp. 111
American Mailing Lists Service, Inc. 115
American Meter Co. 67-70
American Schaeffer & Budenberg Corp. ....
(See Consolidated Ashcroft Hancock Co.)
American Stove Co. ..... 58 & 94
Andale Engineering Co. 111

Bartlett Hayward Co. 22
Boone County Coal Corpn. ..... Front Cover
Botfield Refractories Co. 116
Bristol Co., The 99
Brown Instrument Company 75
Bruce McDonald Co., The 111
Byllesby Engineering & Management Corp. .. 109

Cast Iron Pipe Research Assn. 79
Chambers Mfg. Co. 73
Chaplin-Fulton Mfg. Co. 102
Cheesman-Elliott Co., Inc. 99
Cleveland Gas Burner & Appliance Co., The .. 92
Cleveland Heater Co. 98
Cleveland Trencher Co. 81
Connelly Iron Sponge & Governor Co. 115
Connersville Blower Co. 11
Consolidated Ashcroft Hancock Co., Inc., ... 104
Cruse-Kemper Co. 14
C & G Cooper Co., The 12-13

Darling Valve & Mfg. Co. 8
Dresser, S. R., Mfg. Co 20
Dry Quenching Equipment Corp. 16

Franklin Gas Appliance Co., The 113

Gas Engineering Co. 113
Gas Machinery Co. 10
Gas Purifying Materials Co. 116
General Refractories Co. 18
Godfrey Conveyor Co. 104
Griffin, John J. & Co. 67
Groble Gas Regulator Co. 116

Helme & McIlhenny 67
Homestead Heater Co. 116
Hunt, C. W., Co., Inc. 107

Improved Equipment—Russell Engr. Co 86
Indugas Corp. 88
Isbell Porter Co. 113

Kernit Incinerator Co. 91
Kompak Company 93

Lambert Meter Co. 109
Lamneck Co., The W. E. 98
Lavino & Co., E. J. 113
Ludlow Valve Co. 109

McDonald & Co., D. 67
Maryland Meter Works 67
Metric Metal Works 67
Mueller Company 87

National Tube Co. 95
Naylor Pipe Co. 90

Pittsburgh Equitable Meter Co. 118
Pittsburgh Steel Products Co. 83
Pittsburgh Water Heater Co. 116
Precision Thermometer & Instrument Co. 100

Quigley Furnace Specialties Co. 111

Refractory & Engineering Corp. 100
Remington Rand Business Service Inc. 105
Reynolds Gas Regulator Co. 21
Ridgway & Son Co., Craig 85
Riter-Conley Co. 109
Roberts Gas Burner Corp. 101
Robertshaw Thermostat Co. 97
Roots Co., P. H. & F. M. 19

Safety Gas Main Stopper Co. 107
Semet-Solvay Engineering Corp. 5
Smith Corp., A. O. 89
Smoot Engineering Corp. 6
Sprague Meter Co. ..... Fourth Cover
Stacey Brothers Gas Construction Co. 55
Stacey Manufacturing Co. 4
Superior Meter Co. 85
Staynew Filter Corp. 107

Taylor Instrument Companies 102
Time-o-Stat Controls Corp. 103
Tufts Meter Works, Nathaniel 67

Unger, John S. 113
Union Carbide & Carbon Corp. 15
United Engineers & Constructors, Inc. 7
U. S. Cast Iron Pipe Co. 9
United States Refractory Corp. 116

Victaulic Co., of America 17

Western Gas Construction Co. 2
Wailes, Dove, Hermiston Corp. 119
Wardell, C. W. 114
West Gas Improvement Co. 77
Westmoreland Coal Co. 113

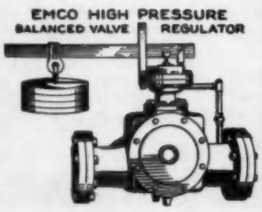
BUYERS REFERENCE INDEX, PAGES 106, 108, 110, 112

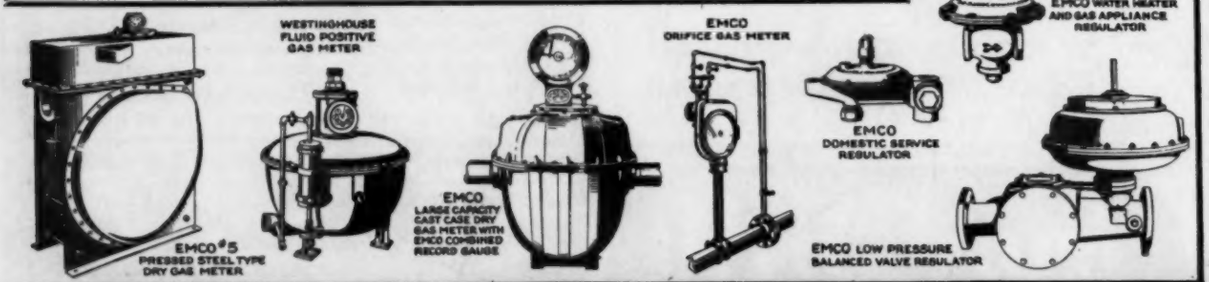
The EMCO Tin Meter

THE design and construction of the EMCO Tin Meter meets the rigid standards already set up for types of meters and regulators bearing the EMCO name. After extensive research rigid specifications were established and are constantly maintained.

Progressive, up-to-the-minute manufacturing methods share greatly in the success of this meter. The interchangeability of EMCO A and B Type meter parts, the easily adjustable tangent, the long wearing rock shaft and the fact that each meter is proved three times before passed as "OK" spell accuracy and reliability.

EMCO—*wherever you go.*




WESTINGHOUSE FLUID POSITIVE GAS METER
EMCO ORIFICE GAS METER
EMCO DOMESTIC SERVICE REGULATOR
EMCO "5" PRESSED STEEL TYPE DRY GAS METER
EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE
EMCO LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

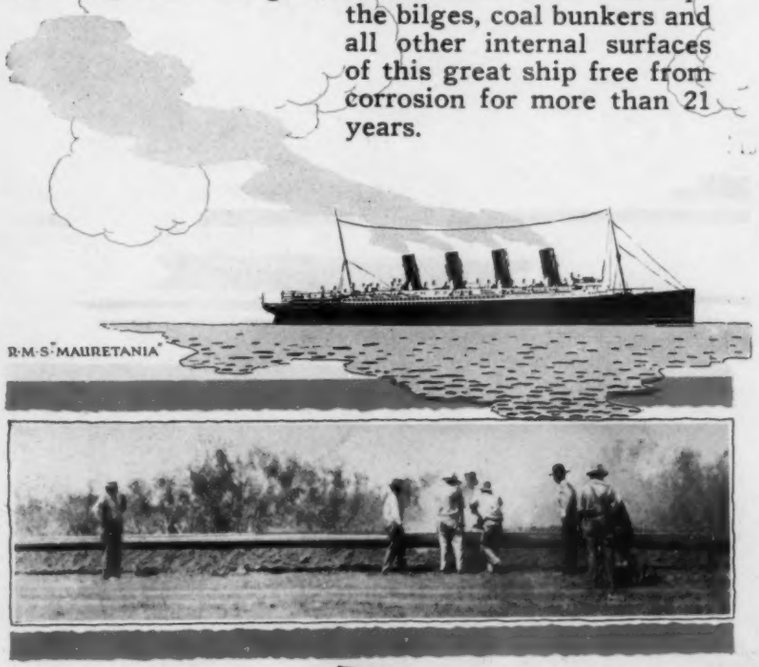
A Monument to the Value of Dependable Protection

Twenty-one years ago, on the River Tyne, there was launched a vessel which stands today a monument to the builder's skill and to the value of dependable protective coatings.

This remarkable ship—the "Mauretania"—has not deteriorated with age but progresses serenely from one new conquest to another. Recently, for instance, after more than 20 years of service, she not only created a speed record by traveling 663 miles in one day, but crossed the Atlantic in the amazing time of 5 days, 3 hours and 17 minutes.

The R.M.S. "Mauretania" is one of more than 15,000 merchant and naval vessels which have protected their inaccessible surfaces with ***Bitumastic Enamel.***

The *original coating* of ***Bitumastic Enamel*** has kept the bilges, coal bunkers and all other internal surfaces of this great ship free from corrosion for more than 21 years.



That ***Bitumastic Enamel*** has been chosen to protect the world's largest gas and oil lines would, in itself, provide no proof were it not that engineers have based their choice on the past performance of ***Bitumastic*** —not only in pipe line but in many other fields. All experience definitely PROVES that ***Bitumastic*** has no equal for the positive long-lived protection of a pipe line. Our book "The Protection of Pipe Lines" summarizes this experience. We will be glad to mail you a copy.

PROOF

PROVEN PROTECTION FOR PIPE LINES

The Memphis Line

A ten million dollar, 18" natural gas line approximately 218 miles long and running between the Monroe Fields in Louisiana and Memphis, Tenn. Protected against corrosion by Bitumastic Enamel.

BITUMASTIC
REG. U.S. PAT. OFF.
ENAMEL

Wailes Dove-Hermiston Corporation

17 Battery Place, New York

Philadelphia Cleveland Chicago Houston Tulsa San Francisco

MASS PRODUCTION

means quantity price reduction

on

SPRAGUE No. 1

Service Regulators equipped with

Sprague Special diaphragms

Sprague Special valve-cap leathers

Nickel Silver Parts

Connections: 3/4" or 1 by 3/4", 1", 1 1/4"

Orifices: 3/16", 5/16", 3/8" or 1/2"

Special Weights for Special Jobs.

Correctly machined for absolutely interchangeable parts.

ASK US FOR QUANTITY PRICES for 1929

SPRAGUE METER COMPANY

BRIDGEPORT, CONNECTICUT